

Evaluation of Pioneer Center North

Submitted to

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Division of Alcohol and Substance Abuse
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by

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EXECUTIVE SUMMARY

INTRODUCTION

Pioneer Center North (PCN), located on the grounds of the old Northern State Hospital, consists of two 65 bed units, one for Mentally Ill, Chemically Abusing (MICA) clients, the other for clients who are civilly committed for chemical dependency treatment in the Involuntary Chemical Dependency Treatment (ICDT) unit. These programs were mandated by legislation passed in 1993, began admitting clients in January 1994, and did not reach capacity until July 1994. The contract is administered by the Department of Social and Health Services (DSHS) through the Division of Alcohol and Substance Abuse (DASA), and the Mental Health Division (MHD) which assumes about 70% of program costs. The enabling legislation also included an evaluation component, reflected in the original contract as a statement that the contractor would assist in a quarterly process evaluation. This initial evaluation did not examine client outcomes after discharge from PCN. The present project, which does focus on client outcomes after discharge from PCN, is based on a contract issued by DASA to the Washington Institute for Mental Illness Research and Training, and to the Alcohol and Drug Abuse Institute of the University of Washington, for the period March 1, 1996 to December 31, 1997. The goals of the evaluation, as worked out in cooperation with DASA, MHD, and PCN, are:

- To assess (a) the utilization of community and institutional services for individuals in these two treatment programs both before and after treatment and (b) the impact of maintaining community linkages during treatment on subsequent use of community services.
- To assess the rates of contact with law enforcement for individuals in these programs both before and after treatment at this facility.
- To assess the cost of maintaining individuals in the community both before and after treatment for those who have completed treatment.
- To (a) identify the data elements in DASA's and MHD's information systems that could be used to produce indices of the desired outcome measures over time, and (b) identify elements necessary for constructing these measures of outcomes, but which are missing from the existing data sets.

METHODS

The major task of this report was to examine the utilization of a variety of health services in the year prior to admission to PCN as well as in the years following discharge. As this study utilized existing databases, it was necessary to match identifiers from the PCN database to those in the databases used to track utilization. Given the different spellings of individuals names, errors in the entry of dates of birth and social security numbers, different individuals with the same first and last names, missing social security numbers, and a host of other factors, the matching is not always easily accomplished. An inventory of the databases used in this study follows.

- **PCN.** This information system provided detailed data on individual social and medical histories, program completion, and mental illness and substance abuse diagnoses. Key patient identifiers used in the matching process were also obtained from this database. For purposes of this report, 1269 persons who were admitted to PCN between July 1, 1994 and January 29, 1997 and were discharged prior to March 1, 1997 were considered. Only the first PCN admission was included; if an individual was admitted to both MICA and ICDT programs, the first admission for each program was analyzed.
- **Vital Status.** Vital status of individuals enrolled in programs at PCN was determined from two sources: first, death records for 1994 through 1996 obtained from the Washington State Department of Health, Center for Health Statistics, and second, hospitalization records for 1993 through 1997 obtained from the Medicaid Management Information System (MMIS). The death records do not contain information on individuals who died out of state or who died in 1997.
- **Alcohol and Substance Abuse Services.** The Treatment and Assessment Report Generation Tool (TARGET) from DASA was used to examine utilization of services for the treatment of alcohol and substance abuse problems. Using first and last name, date of birth, gender, and social security number, TARGET was searched and the likelihood of each match was assessed. All 1269 individuals who were discharged from PCN were matched, because for all individuals, the index PCN admission was included in TARGET. Information on other substance abuse services provided from July 1, 1993 through May 31, 1997 was obtained.
- **Community Mental Health Services.** The Mental Health Management Information System from the MHD was used to examine out patient services for the treatment of mental health problems. Matching on the basis of first and last name, middle initial, date of birth, gender, and social security number was done to identify community mental health services utilization. Information concerning services received from January 1994 through August 1997 included monthly totals of the number of treatment hours for crisis services and all outpatient services combined. Overall 99% of MICA and 66% of ICDT discharges were included in the utilization data.
- **Vocational Rehabilitation Services.** The Division of Vocational Rehabilitation (DVR) provided information concerning PCN clients who applied for DVR services from July 1, 1993, through July 25, 1997. Personnel from DVR matched client names, dates of birth, and social security numbers to client records contained in their databases. The matching process resulted in 328 total applications for DVR services for 142 clients. For each service, the date of service application and the type of service were reported, although actual dates of service were not reported.
- **Employment Security.** Records of earned income provided by the Department of Employment Security are contained in TARGET. Matching on social security number resulted in 612 PCN clients with earned income from the first quarter of 1993 through the last quarter of 1996.

- **Medicaid Health Services.** The Medical Assistance Administration provided information from the Medicaid Management Information System for Medicaid services provided between July 1, 1993 and October 1, 1997. Details of the classification of services and amount reimbursed are provided in Appendix A.

FINDINGS

County sources of admissions

- Of MICA admissions, 32% were from King County, and 12% from Pierce County. No other county had as much as 10%.
- Of ICDT admissions, 21% were from Pierce, 11% from Skagit, and 10% from Spokane. No other county had as much as 10%.

Sample characteristics at time of admission to PCN

- Average age for the MICA sample was 35, 39 for ICDT.
- Among MICA clients, 67% were arrested for misdemeanors, 33% for felonies, 59% of ICDT clients were arrested for misdemeanors, 31% for felonies.
- Males constituted about 70% of both samples.
- Only about 10% of the clients were currently married 60% of the MICA clients, and 47% of the ICDT, had never been married.
- 72% of the ICDT group and 53% of the MICA group had at least one additional major medical problem (e.g., liver disease, respiratory disease, malnutrition).
- 52% of the ICDT and 28% of MICA clients had two or more additional medical conditions.
- Only 8% of the MICA and 10% of ICDT clients had full or part-time employment prior to admission to PCN.
- Rates of psychiatric diagnosis did not change from admission to discharge, but the reliability of these diagnoses was not high.
- Rates of most substance abuse diagnoses declined during the PCN stay. Polysubstance abuse was diagnosed more frequently at discharge than at admission. The reliability of these diagnoses was not high.

Mortality

- Over two years, people discharged from the MICA program died at 1.7 times the rate of people of the same age in the general population.
- Over two years, people discharged from the ICDT program died at approximately 4 times the rate of people of the same age in the general population.

Publicly funded chemical dependency treatment services

- Relative to the year pre-PCN, use of detox services declined sharply in the year following discharge, and continued to decline over the next two years.
- Compared to the year before admission, the use of residential and outpatient services was relatively steady in the year following discharge, and then declined in each of the next two years.

Table E1
Utilization of Substance Abuse Services

Service	Year before admission	1 year after discharge	2 years after discharge	3 years after discharge
MICA (n)	534	534	371	173
Detox	26%	13%	10%	5%
Outpatient*	27%	22%	14%	8%
Residential**	17%	21%	9%	2%
Any service	49%	43%	25%	13%
ICDT (n)	735	735	549	280
Detox	63%	30%	20%	16%
Outpatient*	28%	31%	15%	10%
Residential**	31%	27%	14%	5%
Any service	79%	59%	34%	25%

* Includes outpatient and intensive outpatient

** Includes intensive inpatient, long term residential, extended care, differential diagnosis, recovery house and MICA residential

Publicly funded mental health outpatient treatment services

- Relative to the year preceding PCN admission, mental health crisis services declined sharply in the first year after discharge, and continued to decline thereafter for both the MICA and ICDT programs.
- Compared to the year prior to admission, there was minimal change in the use of all other services in the year after discharge, although in years 2 and 3, there were decreases.

Table E2
Utilization of Community Mental Health Services

Service	Year before admission	1 year after discharge	2 years after discharge	3 years after discharge
MICA (n)	534	534	432	229
All but crisis	91%	87%	69%	56%
Crisis	58%	37%	23%	16%
ICDT (n)	735	735	613	364
All but crisis	37%	38%	32%	18%
Crisis	33%	22%	16%	11%

Medicaid paid medical, psychiatric, and chemical dependency services

- Compared to pre-PCN levels, the numbers of clients receiving relatively expensive inpatient services and unplanned medical emergency services declined following discharge, and continued to decline steadily over time.
- Numbers of clients using outpatient medical services remained relatively constant in the year following discharge, and declined, but more slowly, in the years following.
- Outpatient chemical dependency and mental health services use decreased in the year following discharge, and continued to decline in the subsequent two years, although at least in the case of mental health, these may be underestimates, due to reporting changes.
- From the year prior to admission to the year after discharge, overall Medicaid costs dropped 45% in the MICA group and 29% in the ICDT group.
- When all categories of services for MICA patients were combined, Medicaid costs declined from nearly \$5 million in the year before admission to \$2.8 million in the year after discharge, with further declines in the next two years.

Table E3
Utilization of Medicaid Paid Medical, Psychiatric, and Chemical Dependency Services

Service	Year before admission	1 year after discharge	2 years after discharge	3 years after discharge
MICA (n)	534	534	440	238
Emergency medical	67%	53%	31%	22%
Prescription drugs	90%	88%	71%	60%
Psychiatric hospitalization	43%	18%	10%	6%
Chemical dependency	28%	20%	10%	8%
Mental Health	45%	27%	11%	7%
General medical				
In patient hospitalization	36%	20%	9%	4%
Outpatient	78%	73%	48%	40%
Any service	92%	91%	74%	62%
ICDT (n)	735	735	577	355
Emergency medical	56%	51%	32%	21%
Prescription drugs	64%	69%	53%	41%
Psychiatric hospitalization	16%	9%	7%	3%
Chemical dependency	19%	18%	11%	4%
Mental health	19%	12%	6%	3%
General medical				
In patient hospitalization	31%	22%	15%	10%
Outpatient	62%	65%	44%	30%
Any service	74%	78%	60%	47%

General findings

- Continuity of care was best for clients leaving the MICA program and re-entering community mental health services. Rates of substance abuse service entry were higher in the year following PCN discharge than in the year before, but were lower than rates of use of mental health services. Most clients received more than one type of service both before and after PCN. Overall, more clients received Medicaid support than any other type of service.
- From the period prior to admission to PCN to 3 years after discharge, there were significant decreases in utilization of substance abuse, community mental health, and Medicaid services.
- There were dramatic declines in the utilization of high cost acute care services including detox, crisis, and emergency medical services, as well as psychiatric hospitalizations.
- Individuals who successfully completed their respective programs were less likely to use high cost acute care services and were more likely to use outpatient substance abuse services.
- In the MICA group, 32% completed the PCN program; these individuals had significantly higher use of outpatient services, and lower utilization of mental health crisis and emergency medical services.
- About 30% of both groups worked after discharge but median earnings were less than \$1000 per person per year.
- There was minimal involvement with vocational rehabilitation services.
- Length of stay for MICA patients has stabilized over the last 2 years of the program.
- After discharge, some patients not originally from Skagit County remained in the county for at least 30 days.

Conclusion

This evaluation has demonstrated significant decreases in the use of services, especially high cost acute care services, and major reductions in the overall costs of services over time among individuals who successfully completed their respective programs at PCN. Completing the program was associated with these positive outcomes, but because the study was not randomized and did not include a control group, it is not possible to conclude that the program caused the reported outcomes.

Areas for Further Study

- Include control or comparison groups.
- Examine misdemeanor and felony arrests records. Criminal justice use and costs were not available for consideration in this evaluation.
- In the ICDT group, examine more closely the circumstances that led to civil commitment, for example, were there concomitant criminal proceedings?
- Assess housing status in the period after discharge from PCN.
- Utilization of services has been examined, but the needs the clients have for services should also be assessed.
- Evaluate longer term outcomes for the 1269 individuals in the current evaluation.
- Acquire more detail concerning the types of community mental health services utilization (e.g. medication management, day treatment) and hospitalization at Western or Eastern State.
- Examine in more detail the components of treatment offered at PCN and determine if any of these in particular is associated with improved outcomes.

BACKGROUND

Pioneer Center North (PCN) consists of two 65 bed units, one for Mentally Ill Chemically Abusing (MICA) clients, the other for clients who are civilly committed for chemical dependency treatment (the Involuntary Chemical Dependency Treatment – ICDT – unit), plus a small Central Assessment and Intake Unit (CAIU). These are located on the grounds of the old Northern State Hospital, now the Multi-Service Center, just east of Sedro Woolley in Skagit County. The contract for these services is held by Pioneer Human Services of Seattle.

This program was mandated by legislation passed in 1993. The contract is administered by the Department of Social and Health Services (DSHS) through the Division of Alcohol and Substance Abuse (DASA), although approximately 70% of the costs are from the Mental Health Division (MHD) budget.

The contract was awarded October 1993, with a start-up date of January 1, 1994. However, the program experienced initial difficulties of 2 types. First, the necessary building remodeling was not completed by the scheduled date of January 1: the ICDT unit remodel was not completed until the end of January, the MICA facilities not until mid-March, and the CAIU not until April 20. In spite of the ongoing remodeling, one MICA and 40 ICDT clients were admitted in January, and the programs built up as quickly as facilities would allow. Unit caseloads appear to have reached capacities by July 1994.

The second problem area was in staff and program stability. Through the first 6 to 8 months of startup, there was considerable staff turnover, and problems with recruiting new, appropriate staff, as well as uncertainty, changes, and variability in program implementation. PCN staff felt that these problems were resolved and the program stabilized by the fall of 1994. Insofar as we could see, this was true, although evaluating at this level was not our responsibility. However, most observers of similar programs estimate that it would take *at least* a year for the program to mature; that is, for program content and structure to be debugged and satisfactorily implemented and stabilized (although changes in the program would, of course, continue to be made.) If this experience is valid, then PCN programs were probably achieving stability by the summer of 1995.

The enabling legislation also included an evaluation requirement, reflected in the original contract as a statement that the contractor would assist in a quarterly process evaluation. As it happened, the resources for the original evaluation were provided to PCN, which hired the evaluation organizations, who in turn worked out a set of evaluation questions with PCN and the MICA/ICDT Sub Committee of the state level MICA Oversight Committee. These questions were (1) to assess to what degree the PCN Consolidated Treatment Program Model and its operation facilitated achievement of outcome objectives (listed as a Process Evaluation); (2) to assess to what degree clients benefited from the treatment program (Outcome Evaluation); and (3) to assess to what degree the Mental Health and Substance Abuse Systems were supported by the program (System Impact Evaluation). Only the first of these was addressed at all in any of the reports we have seen from that project. This is not surprising, since the time frames involved essentially precluded outcome and system impact data collection and analyses.

The present project is based on a contract issued by DASA to the Washington Institute for Mental Illness Research and Training, and to the Alcohol and Drug Abuse Institute of the University of Washington, for the period March 1, 1996 to December 31, 1997. The goals of the evaluation, as worked out in cooperation with DASA, MHD, and PCN, are:

(1) To assess (a) the utilization of community and institutional services for individuals in these two treatment programs both before and after treatment, and (b) the impact of maintaining community linkages during treatment on subsequent use of community services. **COMMENT:** Both these goals were addressed in this report, although data to adequately examine the latter have proven to be unavailable.

(2) To assess the rates of contact with law enforcement for individuals in these programs both before and after treatment at this facility. **COMMENT:** This goal was not addressed. We have not yet been able to access data from the Washington State Patrol, which is the most relevant state-wide data source we could identify, but which even so probably would have only partially answered the question.

(3) To assess the cost of maintaining individuals in the community both before and after treatment for those who have completed treatment. **COMMENT:** This goal was addressed in this report, although, because of data limitations, not very thoroughly.

(4) To (a) identify the data elements in DASA's and MHD's information systems that could be used to produce indices of the desired outcome measures over time, and (b) identify elements necessary for constructing these measures of outcomes, but were missing from the existing data sets. **COMMENT:** This goal will be addressed briefly in this report, but in more detail in a separate document.

It was agreed that these goals would be addressed using archival data only, from computerized sources in PCN, DSHS, Department of Health, and Washington State Patrol.

The goals were determined by the end of the summer of 1996. Human subjects review applications were submitted to DSHS in September 1996, but approval was not obtained until May 1997 because of confidentiality concerns. Except for data from PCN, which had independent authority to give us its database in March 1997, data access could not begin until this approval had been obtained. We began obtaining data in June, and received the last data set in November 1997.

LITERATURE REVIEW

The purpose of this evaluation was to examine the cost and utilization of a variety of social and health services in individuals who were discharged from the MICA and ICDT programs at PCN. Cost and utilization were compared for the year prior to PCN admission and for the time after discharge and included alcohol and drug treatment, community mental health, vocational rehabilitation, and Medicaid services. In addition, earned income as reported by the Department of Employment Security was also assessed. While much has been published concerning the contents of treatment programs for MICA patients, little is known about how these patients fare after discharge from residential treatment. Even less is known about the outcomes of those individuals who are involuntarily committed for treatment of alcohol or drug

addiction. This brief review of the meager literature is intended to provide some perspective for the evaluation.

MICA. MICA patients are distinctive in that they have both an underlying mental illness as well as alcohol or drug dependence. Outcomes for MICA patients are worse than outcomes for individuals who are mentally ill but without substance abuse disorders. At 2 years of follow-up in patients treated in a community mental health center, MICA patients were more often arrested, hospitalized, or placed in conservatorship than were their counterparts who were just mentally ill (6). Furthermore, in an analysis of psychiatric hospital readmissions, those with both mental illness and substance abuse diagnoses had more readmissions than those with only a diagnosis of mental illness (5). There is also evidence that the prevalence of the underlying substance disorder changes little from baseline to follow-up (2). Outcomes for MICA patients may be worse because they received both fewer psychiatric and substance abuse services than needed (11). Given that some encounters of MICA patients with the criminal justice system result in incarceration, the correctional system has become increasingly involved with treating these individuals (10). Despite these poor outcomes, some MICA patients are able to work and obtain employment income. One study of 564 homeless adults with major mental or substance abuse disorders demonstrated that 31% of the MICA group had earnings from employment (13).

Certain factors, including specialized treatment, can result in better outcomes, despite the generally bleak prognosis for MICA patients. One key indicator of successful outcome is the decreasing use of acute and subacute services, such as detox, crisis, and psychiatric hospitalization and the increasing use of outpatient and case management services (8). However, what leads one to use outpatient services on a regular basis is not well understood. Since many MICA patients are homeless, the availability of stable housing may be an important factor associated with better outcomes. In a study of 158 homeless adults with mental illness and substance disorders, stable housing was associated with lower substance use, greater progress toward substance abuse recovery, and higher quality of life. The achievement of stable housing was associated with progress toward recovery and less severe drug use, but not baseline variables (4). Specialized interventions such as the 12-Step Recovery Model, Behavioral Skills Model, or Intensive Case Management may reduce costs associated with medical and criminal justice services (9). We could find no published evidence concerning the effect of residential treatment on the cost and utilization of services for MICA patients.

ICDT. Civil commitment brings to treatment those individuals who do not voluntarily seek help for their substance abuse problems. While this may be so, involuntary treatment cannot overcome deficits in services, nor can it guarantee that patients will participate in treatment (12). How substance abuse commitment works varies according to jurisdiction; in one jurisdiction, it occurred frequently as an adjunct to criminal proceedings (3). It has been reported that involuntary commitment when combined with post discharge care resulted in better outcomes than did voluntary treatment for opioid addicts (1,7,12). Whether involuntary treatment is effective for individuals with alcohol or drug problems other than opioids is unknown. Published research in this area does not exist.

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METHODS

The major objective of this report was to examine the utilization of a variety of health services in the year prior to admission to PCN as well as in the years following discharge. As this study utilized existing databases, it was necessary to match identifiers from the PCN database to those in the databases used to track utilization. In all cases, key identifiers including first and last names, date of birth, gender, and social security number were used. Bill Jones of the Alcohol and Drug Abuse Institute of the University of Washington has developed complex algorithms to assess the likelihood of matches based on these criteria. Given the different spellings of individuals' names, errors in the entry of dates of birth and social security numbers, different individuals with the same first and last names, missing social security numbers, and a host of other factors, the matching process can be hard to accomplish. With the exception of Medicaid and vocational rehabilitation services data, matching was done by the staff of this project. Personnel from the Medical Assistance Administration (MAA) and the Division of Vocational Rehabilitation (DVR) identified matches for data based on a 14 character identification code and/or the social security number. An inventory of the databases used in this study follows.

PCN. This information system provided detailed data on individual social and medical histories, program completion, and mental illness and substance abuse diagnoses. Key patient identifiers used in the matching process were also obtained from this database. For purposes of this report, 1269 persons who were admitted to PCN between July 1, 1994 and January 29, 1997 and were discharged prior to March 1, 1997 were considered. Only the first PCN admission was included; if an individual was admitted to both MICA and ICDT programs, the first admission for each program was analyzed.

Vital Status. Vital status of individuals enrolled in programs at PCN was determined from two sources: first, death records for 1994 through 1996 obtained from the Washington State Department of Health, Center for Health Statistics, and second, hospitalization records for 1993 through 1997 obtained from the Medicaid Management Information System (MMIS). The death records do not contain information on individuals who died out of state or those who died in 1997. Age adjusted rates of death were calculated using the direct method of standardization. Total deaths for the 1996 United States population were obtained from the National Center for Health Statistics (*Monthly Vital Statistics Report*, Vol 45, No 12, 1997). The age distribution of the 1990 US population was used as the standard population.

Alcohol and Substance Abuse Services. The Treatment and Assessment Report Generation Tool (TARGET) from DASA was used to examine utilization of services for the treatment of alcohol and substance abuse problems. Using first and last name, date of birth, gender, and social security number, TARGET was searched and the likelihood of each match was assessed. All 1269 individuals who were discharged from PCN were matched, because for all individuals, the index PCN admission was included in TARGET. Information on other substance abuse services provided from July 1, 1993 through May 31, 1997 was obtained.

Community Mental Health Services. In order to determine if persons discharged from PCN received community mental health services, it was necessary to match PCN identifiers with

those in the community mental health information system. Matching was done on the basis of first and last name, middle initial, date of birth, gender, and social security number, if available. First, all identifiers in the community mental health system were searched, and the likelihood of each match was assessed. For each match, utilization data from the community mental health information system were extracted by MHD personnel; these data, which contained services from January 1994 through August 1997, included only monthly totals of the number of treatment hours aggregated across all outpatient modalities, and also for crisis services separately. Overall 99% of MICA and 66% of ICDT discharges were included in the utilization data. In the MICA group, only 1 person was not present in the file of identifiers and additional 6 were not present in the utilization data.

Vocational Rehabilitation Services. The DVR provided information concerning PCN clients who applied for DVR services from July 1, 1993, through July 25, 1997. A data file containing client names, dates of birth, and social security numbers was matched by DVR personnel to client records contained in DVR databases. The matching process resulted in 328 total applications for DVR services for 142 distinct social security numbers. For each service, the date of service application and the type of service were reported, although actual dates of service and outcomes were not reported.

Employment Security. DASA provided a file containing employment security data for the first quarter 1993 through the last quarter 1996 for 47,315 TARGET records. For the 1269 PCN clients, there were 612 matches on social security number provided by PCN and 673 on the TARGET social security number. After careful checking, it was decided to use the PCN social security number as the standard, although in a few cases where the amount of earnings (> \$40,000) was so high and TARGET indicated the individual was homeless, it was decided to use the TARGET social security number. In these cases, the social security number was only off by one digit.

Medicaid Health Services. The MAA provided information from the Medicaid Management Information System (MMIS) for Medicaid services provided between July 1, 1993 and October 1, 1997. Details of the classification of services and amount reimbursed are provided in Appendix A.

FINDINGS

General Description of Samples:

Patient Characteristics. Tables 1 and 2 describe characteristics of 1269 individuals admitted to the two programs since July 1, 1994; there were 534 patients enrolled in the MICA program and 735 in the ICDT program. Seventy-three persons (6%) participated in both programs and are included in each group. While this may result in “double counting,” it should be recognized that each program is being evaluated separately. It was also the case that a significant proportion of clients was admitted more than once to each program, as seen in Figure 1. Since July 1, 1994, 9.9% and 15.6% of MICA and ICDT clients, respectively, had more than one admission; in the latter program, 3.5% had 3 or more admissions. Clients admitted to one program more than once in the time period are counted only for the first admission.

Individuals in these two programs were predominantly single, white men who were referred mainly from King, Pierce, Skagit, Snohomish, and Spokane counties. Referral rates by county are shown in Table 3 and by RSN in Table 1. There was considerable variation in referral rates within and between programs. Some of the within program variation was due to the fact that several small counties sent only 1 or 2 individuals. King County was the referral source for a significant number of MICA clients, although its rate per 10,000 was near average, and it had a low rate for ICDT clients. Not surprisingly, rates for Skagit County, where PCN is located, were relatively high.

Prior to admission, most individuals had been arrested for misdemeanors (67% of MICA clients and 59% of ICDT clients), and over 30% of both groups had been arrested for one or more felonies. Despite their relative youth, as seen in Table 2, many individuals in both groups had important medical problems including ulcer, respiratory, and liver diseases. In addition to their underlying psychiatric diagnoses and chemical dependencies, these individuals had other significant health problems.

Vital status. Cumulative two year survival for the MICA and ICDT groups was 98% and 95%, respectively. The age adjusted death rate in the MICA group was 12.9 per 1000 persons per year, and in the ICDT group it was 29.4 per 1000. In comparison, the age adjusted US death rate for persons 15 through 80 was 7.4 per 1000, indicating that mortality was 1.7 times higher in the MICA group and almost 4 times higher in the ICDT group. Overall, there were 7 deaths in the MICA group and 29 in the ICDT group; causes of death are listed in Table 4. Almost 50% of deaths were due to accidents associated with substance abuse, and many of the deaths with medical causes were undoubtedly related to substance abuse.

Comment. While none of the variables available is a direct measure of severity, the groups' standing on several of these characteristics does suggest a fairly serious level of disability. First, a very small proportion of both groups is currently married, and a high proportion has never been married. The clients also report very low levels of full or part-time employment prior to admission, and rather high rates of arrests for both misdemeanors and felonies. They have high levels of medical problems and high levels of multiple medical problems, both of these especially in the ICDT group. Finally, after discharge both groups, but

again particularly ICDT, had unusually high mortality rates. In an individual none of these (except death) would prove severe disability, but as group averages or rates, and in combination, they are suggestive of relatively serious problems.

Table 1
Sociodemographic Characteristics

	MICA (n=534)	ICDT(n=735)
Age at Admission	35 \pm 9	39 \pm 10
Women	29%	30%
Race		
Asian	1%	< 1%
Black	9%	6%
White	82%	85%
Hispanic	3%	1%
Native American	4%	8%
Other	< 1%	0%
Referring RSN		
Clark	4%	4%
Greater Columbia	10%	5%
King	32%	6%
North Sound	17%	22%
Peninsula	4%	5%
Pierce	12%	19%
Southwest	1%	8%
Spokane	8%	8%
Thurston/Mason	6%	2%
Others	6%	4%
Unknown	<1%	17%
Referring Agency Type		
Chemical dependency	18%	85%
Mental health center	76%	11%
Both	1%	2%
Psychiatric hospital	3%	< 1%
Other	2%	2%
Arrest Prior to Admission		
Misdemeanor	67%	59%
Felony	33%	31%
Marital Status		
Single, never married	60%	47%
Separated	8%	11%
Divorced	23%	29%
Married	9%	12%

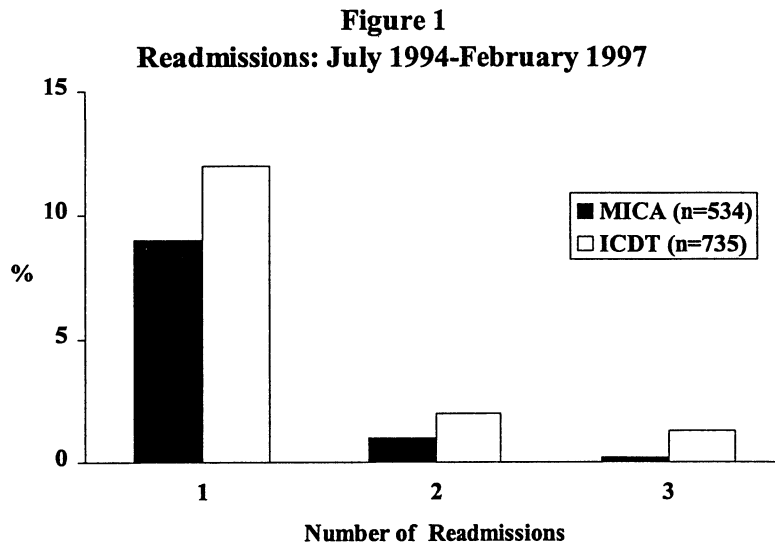
Table 2
Physical and Social Functioning

	MICA (n=534)	ICDT(n=735)
Medical History		
Diabetes	2%	4%
Pancreatitis	5%	8%
Ulcers	19%	21%
GI bleeding	7%	18%
Seizures	13%	32%
Cardiac	9%	18%
Liver disease	18%	43%
Respiratory disease	17%	21%
Thyroid	4%	2%
Malnutrition	13%	28%
Number Medical Conditions		
None	47%	28%
One	25%	20%
Two or more	28%	52%
Activity Level Prior to Admission		
Full time employment	4%	6%
Part time employment	4%	4%
Day treatment	24%	6%
No structured activities	69%	84%

Medical history categories sum to more than 100%, because some individuals had more than one medical condition.

Table 3
Referral Rates by County

County	MICA		ICDT		1996 population
	#	# /10,000	#	#/10,000	
Asotin	7	3.6	1	0.5	19,600
Benton	8	0.6	19	1.5	131,000
Chelan	4	0.7	1	0.2	61,300
Clallam	7	1.1	26	4.0	65,000
Clark	20	0.7	37	1.2	303,500
Columbia	2	4.8	1	2.4	4,200
Cowlitz	6	0.7	65	7.2	90,800
Ferry	3	4.2	3	0.4	7,200
Franklin	3	0.7	2	0.5	43,700
Grant	3	0.5	----	----	66,400
Grays Harbor	3	0.4	13	1.9	68,200
Island	9	1.3	12	1.7	70,300
Jefferson	1	0.4	3	1.2	25,700
King	173	1.1	49	0.3	1,628,800
Kitsap	12	0.5	28	1.2	224,700
Kittitas	6	2.0	2	0.6	30,800
Klickitat	1	0.5	2	1.1	18,700
Lewis	4	0.6	2	0.3	66,700
Lincoln	----	----	2	2.0	9,800
Mason	7	1.5	1	0.2	46,700
Okanogan	10	2.7	3	0.8	37,500
Pacific	1	0.5	1	0.5	21,100
Pend Oreille	----	----	1	0.9	11,100
Pierce	67	1.0	156	2.3	665,200
San Juan	1	0.8	5	4.0	12,400
Skagit	20	2.1	79	8.3	95,500
Snohomish	47	0.9	49	0.9	538,100
Spokane	44	1.1	76	1.9	406,500
Stevens	3	0.8	8	2.2	36,600
Thurston	26	1.3	18	0.9	193,100
Wahkiakum	----	----	1	2.6	3,800
Walla Walla	4	0.7	15	2.8	53,400
Whatcom	12	0.8	51	3.3	152,800
Whitman	3	0.7	1	0.2	41,000
Yakima	17	0.8	2	0.1	207,600
Statewide	534	1.0	735	1.3	5,516,800



The x axis indicates the number of readmissions to the PCN during the 2.5 year period. The y axis designates the percent of MICA and ICDT patients with 1, 2, or 3 readmissions. For example 9% of MICA and 12% of the ICDT patients were readmitted once. Multiple readmissions were relatively uncommon; only 1% and 2% of MICA and ICDT patients, respectively, were readmitted twice.

Table 4
Cause of Death

MICA (n=7)
Medical
Phlebitis of deep vessels
Drug abuse, not otherwise specified
Injury
Accidental poisoning-cocaine
Accidental poisoning-psychostimulants
Accidental suffocation
Suicide by hanging, strangulation, or suffocation
Suicide by drugs or medicinal substances
ICDT (n=29)
Medical
Acquired immune deficiency syndrome
Acute myocardial infarction
Alcoholic cardiomyopathy
Alcoholic cirrhosis of liver (2)
Alcohol dependence syndrome
Alcoholic fatty liver
Alcoholic liver damage
Alcoholic psychosis
Cancer-lung
Cancer-brain or spine
Hypertensive heart disease
Opioid abuse
Viral hepatitis
Pneumonitis
Primary cardiomyopathy
Primary pulmonary hypertension
Injury
Accidental death-excessive cold
Accidental death-unspecified fall
Accidental poisoning-alcohol
Accidental poisoning-antidepressants
Accidental poisoning-carbon monoxide
Accidental poisoning-cocaine
Assault by other or unspecified firearm
Suicide-drowning
Suicide-other specified drug (2)
Poisoning undetermined whether accidental or purposely inflicted-analgesics (2)

Utilization of Alcohol and Substance Abuse Services

TARGET was used to determine the utilization of alcohol and substance abuse services for the two groups. Services provided between July 1, 1993 and May 31, 1997 were considered in this analysis. Utilization was determined for the following periods: 1) 1 year prior to PCN admission, 2) 30 days after discharge from PCN, 3) first year after discharge, 4) second year after discharge, and 5) third year after discharge. Since some patients died, or others were enrolled later in the course of study, 2 and 3 year follow-ups were not complete for all individuals. Some treatment modalities in TARGET were combined for Table 5. "Residential" includes long term residential, extended care, and recovery house modalities. "Outpatient" includes both outpatient and intensive outpatient modalities.

As seen in Table 5, overall the use of services for both groups declined from the year before admission to the year after discharge. Notable for both groups, but particularly for individuals in the ICDT program, was the marked decline in the use of detox services. In the year prior to admission, 63% of patients in the ICDT program used detox services, whereas in the year after only 30% did. In the MICA group, use of detox services declined from 26% in the year prior to admission to 13% in the year after discharge. For the most part, the use of other services remained relatively stable from the year prior to admission to the year after discharge. For example in the year prior to admission, 27% of individuals in the MICA program used outpatient services, whereas in the year after discharge 22% did. The percent using outpatient services declined sharply to 14% in year 2 and 8% in year 3. There was a slight increase in the use of residential (8% to 10%) and MICA residential (3% to 10%) from the year prior to admission to the year after discharge. In the year after discharge, 57% of individuals in MICA did not use alcohol and substance abuse services reported in TARGET, and only 28% used services both prior to admission and after discharge. For the ICDT group, declines in utilization in years 2 and 3 were also present, although as expected, overall service use was higher both pre-admission and post-discharge. The utilization of outpatient services increased very slightly from 28% in the year prior to admission to 31% in the year after discharge, although use dropped noticeably to 15% in year 2 and 10% in year 3. In the year after discharge, 41% of individuals in the ICDT program did not use any services, 55% used services both prior to admission and after discharge. When these analyses were repeated for only individuals with 3 years follow-up, the general trends noted for the MICA and ICDT groups did not change.

More detail on the utilization of alcohol and substance abuse services in the year after discharge is shown in figures 2 and 3, which illustrate the proportion of patients using services in each of the first 12 months after discharge. Again, there were declines in the use of all services from month 1 to month 12 for both groups. There were marked declines in residential treatment from month 1 to month 2, and for the ICDT group the use of detox services decreased from 10% at month 1 to 4% at month 12.

Comment. Forty-three percent of MICA and 59% of ICDT discharges received some amount of substance abuse service in the year following discharge. It would be helpful to have some basis for determining the degree to which this is a positive result. This is a point where a control group, or at least a reasonable expectation based on community experience, would be extremely helpful. It should also be noted that these analyses are based on a yes/no whether *any*

services were received, without attempting to quantify amount or characterize patterns of services over time.

It is also difficult to interpret the decline in services over the 3 years following discharge. It is true that chemical dependency problems and treatment are episodic in nature, and that clients therefore may go in and out of treatment, or that they may be active in support groups not recorded in our data sets. However, given that these are fairly severely disabled clients, it is reasonable to expect that their service needs are not likely to have completely gone away. Since this issue cuts across all the areas of service, we will defer discussion on it to the Summary section.

Table 5
Utilization of Substance Abuse Services

Service	Year before admission	30 days after discharge	1 year after discharge	2 years after discharge	3 years after discharge
MICA (n)	534	534	534	371	173
Detox	26%	2%	13%	10%	5%
MICA	3%	3%	10%	3%	0.6%
residential					
Other	8%		10%	5%	1%
residential*					
Intensive	3%	0.2%	0.7%	0.3%	0.6%
inpatient					
Methadone	1%	0.0%	0.9%	0.8%	0.6%
Outpatient**	27%	10%	22%	14%	8%
Differential	3%	0%	0.7%	0.3%	0%
diagnosis					
None	51%		57%	75%	87%
ICDT (n)	735	735	735	549	280
Detox	63%	10%	30%	20%	16%
MICA	6%	3%	4%	2%	0.4%
residential					
Other	15%	7%	20%	10%	4%
residential*					
Intensive	8%	1%	3%	2%	1%
inpatient					
Methadone	0.7%	0%	0.7%	0.9%	0.7%
Outpatient**	28%	15%	31%	15%	10%
Differential	2%	0.1%	0.4%	0.2%	0%
diagnosis					
None	21%		41%	66%	75%

* Includes Long Term Residential, Recovery House, and Extended care modalities.

** Includes Outpatient and Intensive Outpatient Modalities.

Figure 2
Utilization of Alcohol and Substance Abuse Treatment-MICA

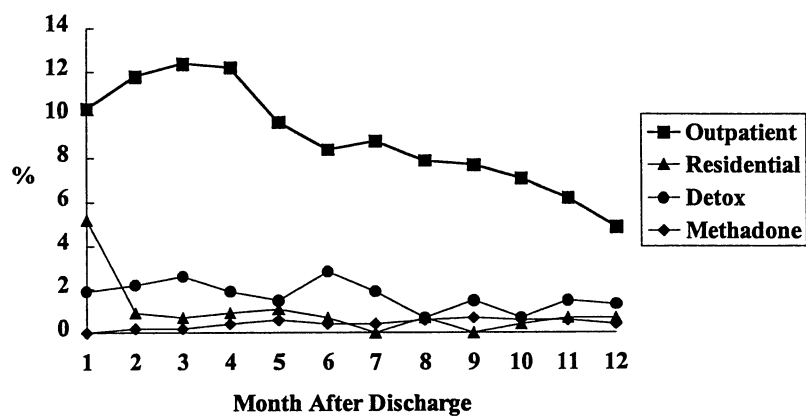
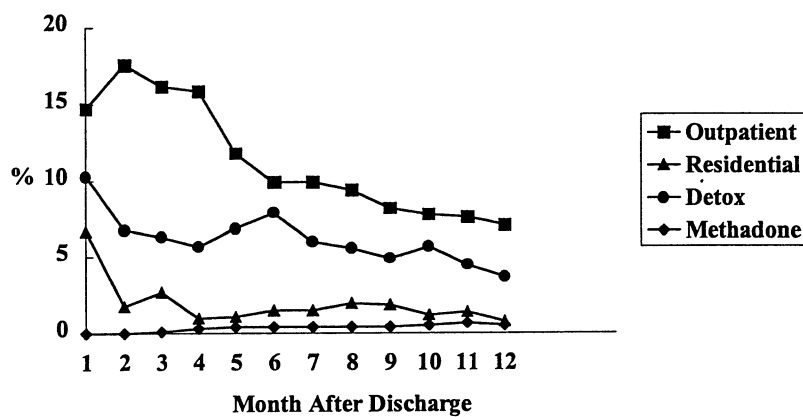


Figure 3
Utilization of Alcohol and Substance Abuse Treatment-ICDT



Utilization of Community Mental Health Services

The Mental Health Management Information System (MHMIS) was used to assess utilization of community mental health services by individuals in the two treatment programs. Service utilization from January 1994 through August 1997 was assessed. As with alcohol and substance abuse services, utilization was determined for the following periods: 1) 1 year prior to PCN admission, 2) 30 days after discharge from PCN, 3) first year after discharge, 4) second year after discharge, and 5) third year after discharge. Since some patients died, or others were enrolled later in the course of study, 2 and 3 year follow-ups were not complete for all individuals. Only the number of treatment hours for crisis services and for all outpatient services combined were provided in the database.

There were distinct declines in the use of community mental health services in persons discharged from both programs. In the MICA group, 95% of patients utilized services prior to admission and this number decreased slightly to 88% by the first year as seen in Table 6. The use of crisis services declined more noticeably from 58% before admission to 37% in the year after admission. Only 5% of patients did not receive services prior to admission; this is not surprising given that most MICA patients were referred to PCN through the regional support networks (RSNs). Only 10% of the MICA group failed to receive services at some point after discharge, and 86% received services both prior to admission and after discharge. When only patients with 3 years follow-up were included, these trends did not change. More detail concerning service utilization in the year following discharge is provided in figure 4. There was a noticeable decline in monthly proportions of clients using all services in the first 12 months, although the use of crisis services was relatively constant throughout the year. Table 7 shows mean and median hours of service for those individuals receiving services. Over the 3 years of follow-up there were declines in the median number of hours for all services, as well as striking reductions in the numbers of persons being served. The mean values for crisis services tend to be inflated by those few individuals who continued to use services frequently or intensely.

The proportion of individuals using community mental health services was much lower in the ICDT group. In fact, 52% did not receive services prior to admission, and 51% did not use services at any time after discharge from PCN. Only 37% received mental health services during both periods. As in the MICA program, there were distinct declines over time in the use of services. As seen in Table 6, 37% used some services other than crisis in the year before admission; this percent increased minimally to 38% in the year after discharge and then dropped to 32% at year 2 and to 18% at year 3. There was also a distinct and steady decline from the year prior to admission to 3 years after discharge in the use of crisis services. When only patients with 3 years follow-up were included, these findings persisted. Median hours of total services also declined, although they were slightly higher in the year following discharge; the median hours of crisis services were relatively stable, while the number using the service declined. These declines were also evident in the year following discharge as seen in Figure 5. By the end of one year after discharge, 38% had used a variety of community mental health services other than crisis services, which were used by 22% of ICDT clients.

Comment. These results suggest that the mental health service providers are doing a very good job of getting MICA clients back into treatment, and of reducing their use of crisis

services. Again there were declines in service use over time as seen in figures 4 and 5. For ICDT, the proportion of clients receiving non-crisis services is the same in the first year post as in the year pre, and declines over the second and third years post. Crisis utilization declines from the year pre to the first year post, and continues to decline in post years two and three. This *pattern* is similar to that for the MICA clients, but the ICDT *levels* of service are much lower. This is probably reasonable for a program with less emphasis on mental illness. It is true that the proportion of the clients who are assigned a major Axis I diagnoses is higher than the proportion receiving mental health treatment, but these clients may not meet other criteria necessary for eligibility for public mental health services.

Table 6
Utilization of Community Mental Health Services

Service	Year before admission	30 days after discharge	1 year after discharge	2 years after discharge	3 years after discharge
MICA (n)	534	534	534	432	229
All but crisis	91%	68%	87%	69%	56%
Crisis	58%	8%	37%	23%	16%
None	5%		12%	29%	43%
ICDT (n)	735	735	735	613	364
All but crisis	37%	22%	38%	32%	18%
Crisis	33%	5%	22%	16%	11%
None	52%		57%	65%	78%

Table 7
Hours of Community Mental Health Services for Consumers Receiving These Services

	Mean	SD	Median	N
MICA				
All services but crisis				
1 year before	78.6	120.3	34.2	486
30 days after	11.0	23.4	4.5	362
1 year after	76.5	115.1	39.2	464
2 years after	63.5	109.7	21.1	298
3 years after	56.5	99.9	18.0	128
Crisis Services				
1 year before	6.6	10.4	3.5	307
30 days after	5.2	10.6	1.5	45
1 year after	7.8	15.8	2.9	198
2 years after	12.8	23.8	3.5	99
3 years after	13.0	34.9	2.0	37
ICDT				
All services but crisis				
1 year before	60.9	139.7	17.0	275
30 days after	8.1	13.3	3.0	162
1 year after	51.4	88.6	18.2	281
2 years after	53.3	112.0	13.1	194
3 years after	32.3	54.2	10.2	67
Crisis Services				
1 year before	4.7	11.3	2.0	240
30 days after	2.9	5.2	1.5	36
1 year after	8.9	20.5	2.2	165
2 years after	13.6	30.5	2.9	97
3 years after	37.1	129.7	2.5	40

Figure 4
Utilization of Community Mental Health Services-MICA

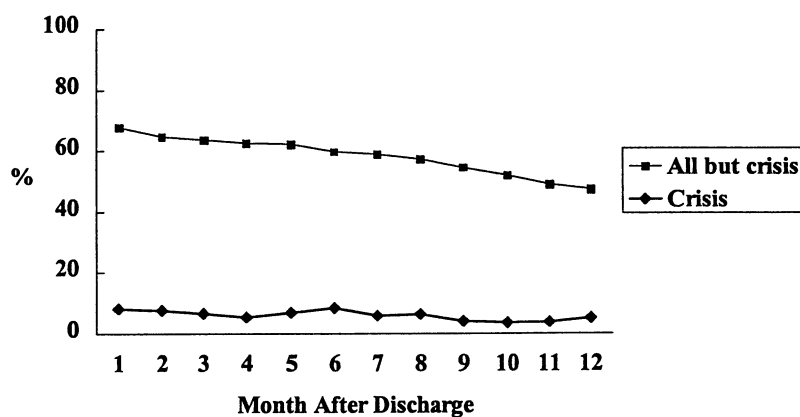
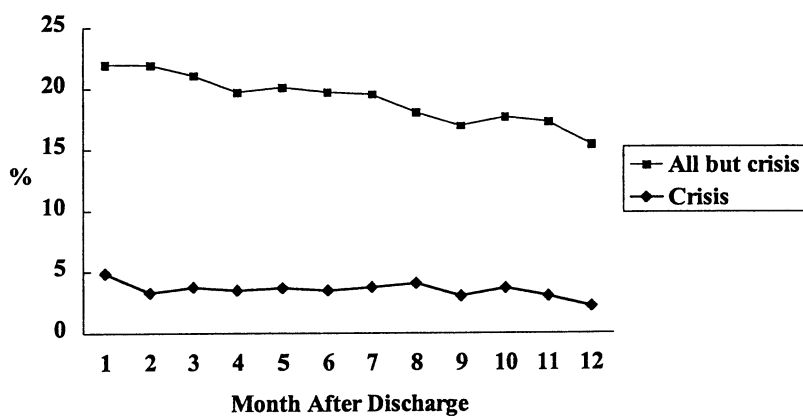


Figure 5
Utilization of Community Mental Health Services-ICDT



Application for Vocational Rehabilitation Services

The proportions of patients who applied for DVR services were examined for the year before PCN admission and for the 3 years following discharge and are shown in Table 8. Applications from July 1, 1993 through July 31, 1997 were provided; there were 21 different types of services reported: the most common included assessment services (41%), training (20%), transportation (16%), and job development and placement (15%). As was the case in other analyses, clients varied in how long they had been discharged, hence the denominators differ for years 2 and 3. The proportion of PCN clients applying for vocational rehabilitation services was very low. In the MICA group only 7% of patients applied for services at anytime after discharge and in the ICDT group only 5% did so. Less than 1% of either group applied for services both during the time prior to admission and the time after discharge. It is important to recognize that this information only refers to applications for service, and not whether service was received or how it was completed.

Comment. This service is clearly one that should be time limited. Although the numbers are very small, it may be of interest that the rate of applications for the MICA group doubled in the year following PCN, and then returned to the pre-PCN baseline level. Even though small, if this pattern were replicated, it would suggest a favorable pattern.

Table 8
Application for Vocational Rehabilitation Services

	Year before admission	1 year after discharge	2 years after discharge	3 years after discharge
MICA (n)	534	534	408	213
	2.2%	5.2%	2.5%	0.9%
ICDT (n)	735	735	585	323
	3.4%	3.1%	1.9%	0.3%

Earned Income

Quarterly earnings for the third quarter of 1993 through the last quarter of 1996 were provided by the Department of Employment Security. Table 9 shows total earnings for the 4 quarters before and the 5 quarters after PCN discharge, including the last quarter of the PCN stay, as well as the proportion of clients who had earnings during these periods. Follow-up information is incomplete for those clients who were enrolled during or after the first quarter of 1996; hence the numbers for whom information was available for the year after discharge differ from those for the year before admission. Mean and median annual earnings are reported only for those clients who had earned income. In the MICA group, there was a slight increase from 22% to 27% in individuals with earnings, whereas in the ICDT group there was a slight decrease. In both groups, both mean and median amounts earned were low and decreased from the year before admission to the year after discharge. The median earnings in the year after discharge were \$459 for the MICA group and \$916 for the ICDT group. The mean value is inflated by those very few individuals who had higher earnings indicative of full or part time employment.

Table 9
Earned Income for Clients with Earnings

	Year Before Admission	Year After Discharge
MICA (n)	534	377
% with earnings	22%	27%
Mean \pm standard deviation	\$1981 \pm 3244	\$1328 \pm 2475
Range	(\$7-\$17,722)	(\$10-\$19,537)
Median	\$584	\$459
ICDT (n)	735	577
% with earnings	34%	31%
Mean \pm standard deviation	\$3447 \pm 5264	\$2756 \pm \$4498
Range	(\$15-\$35,481)	(\$10-\$27,486)
Median	\$1289	\$916

Utilization of Medicaid Services

The utilization of Medicaid services is shown in Table 10. Remarkably, 92% of those discharged from the MICA program had some kind of Medicaid support prior to admission to PCN, and 91% in the year following discharge, with 87% utilizing services in both the time prior to admission and the time after discharge. In the time prior to admission to PCN, 90% had prescription drugs paid for by Medicaid. With the exception of nursing home congregate care services, amount of support declined in all categories in the period after discharge from PCN. Of particular importance were large declines in the use of emergency department services, psychiatric hospitalization, and in-patient hospitalization for general medical purposes. The percent of individuals using emergency department services declined from 67% prior to admission to 53% at 1 year after discharge and 31% at 2 years after discharge. For psychiatric hospitalizations, it was 43% prior to admission, 18% 1 year after discharge, and 10% 2 years after discharge. The use of in-patient hospitalization decreased from 36% prior to discharge to 20% at 1 year and 9% at 2 years after discharge. The use of chemical dependency and mental health services also decreased, although reporting for mental health services may not be complete, as the institution of managed care for mental health services in Washington State has affected the reporting of these services in the MMIS. The findings did not change when only patients with a full 3 years of follow-up were analyzed.

In the ICDT group, 74% had service utilization prior to admission to PCN, increasing slightly to 78% in the year following discharge, with 67% receiving services in both the time prior to admission and at some time after discharge. For the ICDT program the proportion receiving services was not as high as it was for the MICA program. Whether this means these individuals received their medical care in other settings (e.g. the Department of Veterans Affairs medical centers) or received no medical care at all is not possible to determine. There were slight increases in the proportions receiving prescriptions and general medical outpatient services, but as with the MICA group, there were declines in the first year in the types of medical services that required considerable resources, and declines in all categories over the three years post discharge. The use of emergency department services decreased from 56% prior to admission to 51% 1 year after discharge and to 32% 2 years after discharge. Psychiatric hospitalizations, while occurring less frequently than in the MICA program, declined from 16% prior to admission to 9% at 1 year and 7% at 2 years. Similarly, in-patient hospitalization decreased from 31% prior to admission to 22% at 1 year after discharge and to 15% at 2 years. As in the MICA group, when only patients with 3 years follow-up were considered, the overall findings persisted.

Comment. Clearly the use of Medicaid reimbursed services is very high for these individuals, especially the MICA group, both before and after PCN. Although the pattern of utilization drop-off in years 2 and 3 seen elsewhere also applies here, levels of use remain relatively high, again, especially in the MICA group.

Table 10
Utilization of Medicaid Services

Service	Year before admission	30 days after discharge	1 year after discharge	2 years after discharge	3 years after discharge
MICA (n)	534	534	534	440	238
Emergency medical	67%	16%	53%	31%	22%
Prescription drugs	90%	64%	88%	71%	60%
Detox	0.6%	0%	0.4%	0%	0.4%
Psychiatric hospitalization	43%	4%	18%	10%	6%
Chemical dependency	28%	8%	20%	10%	8%
Mental health	45%	12%	27%	11%	7%
General medical					
In-patient hospitalization	36%	5%	20%	9%	4%
Outpatient	78%	36%	73%	48%	40%
Nursing home	0.9%	0.6%	1.9%	0.7%	0.4%
Any service	92%	75%	91%	74%	62%
ICDT (n)	735	735	735	577	355
Emergency medical	56%	18%	51%	32%	21%
Prescription drugs	64%	42%	69%	53%	41%
Detox	4%	0.3%	2%	0.7%	0.3%
Psychiatric hospitalization	16%	1%	9%	7%	3%
Chemical dependency	19%	8%	18%	11%	4%
Mental health	19%	4%	12%	6%	3%
General medical					
In-patient hospitalization	31%	4%	22%	15%	10%
Outpatient	62%	33%	65%	44%	30%
Nursing home	2%	0.3%	2%	2%	1%
Any service	74%	57%	78%	60%	47%

Combinations of services

In an effort to better understand patterns of utilization, in both programs we examined the proportions of individuals using services supported by the 3 major divisions of DSHS: DASA, MHD, and MAA (Table 11). In the MICA program, it is notable that almost 90% used the combination of community mental health services and Medicaid, or services from all 3 sources in the year prior to PCN admission. For the period after discharge, nearly 85% used these combinations. The numbers using only one type of services were minimal. All individuals in the MICA program received services either before admission or after discharge.

In the ICDT program, utilization was not quite as pervasive as in the MICA program, although here substance abuse services were predominant, sometimes alone, but more commonly with Medicaid or Medicaid plus mental health. In the period prior to admission, over 60% of the clients used the combination of alcohol and substance abuse services plus Medicaid support, or all 3 types of service. In the post discharge period, this number approached 60%. There were 14 individuals who had no reported services before admission or after discharge. One of these individuals had earned income, which may have rendered him or her ineligible for services. None of them applied for vocational rehabilitation services and none died, although it is possible they may have left the state.

Comment. Very few individuals failed to receive any services from these sources either before or after PCN, although the rate receiving none went up slightly after PCN treatment. What is perhaps more striking is that the very large majority of clients were receiving services from multiple sources, not infrequently from all three programs.

Table 11
Service Utilization

Type of service	Before admission	After discharge
MICA (n=534)		
Alcohol and substance abuse only (1)	0.2%	0.2%
Community mental health only (2)	4.7%	3.4%
Medicaid only (3)	1.9%	4.5%
(1)+(2)	1.1%	1.3%
(1)+(3)	1.7%	2.6%
(2)+(3)	43.1%	42.1%
(1)+(2)+(3)	45.7%	42.7%
None	1.7%	3.2%
ICDT (n=735)		
Alcohol and substance abuse only (1)	12%	5%
Community mental health only (2)	3%	2%
Medicaid only (3)	4%	10%
(1)+(2)	5%	2%
(1)+(3)	30%	24%
(2)+(3)	8%	12%
(1)+(2)+(3)	32%	33%
None	6%	12%

Costs of interventions

Reimbursement for Medicaid services. Mean and median reimbursements for services from Medicaid are shown in Tables 12 and 13. These figures represent the actual dollar amounts paid to providers, with the N column indicating the number of patients who received services in the time period. As indicated in Appendix A, these amounts were adjusted to 1997 dollars. In the MICA group, there were significant declines in both mean and median reimbursement for all services combined; mean reimbursement declined from approximately \$10,000 per patient in the year prior to admission to \$5700 per patient in the year after discharge. The mean values are considerably higher than the medians indicating that some individuals incurred very high costs. These declines were also evident for emergency medical services, as well as psychiatric hospitalization and outpatient services. This decline was not apparent for mean inpatient hospitalization reimbursement, which actually increased from \$2600 in the year prior to admission to \$3600 in the year after discharge. However, as previously indicated, the number of patients hospitalized decreased. In terms of total costs, there were reductions in all categories except medications and nursing home expenditures, the latter a very small cost. When all categories are combined, costs declined from nearly \$5M in the year before admission to \$2.8M in the year after discharge, with further declines in the next two years.

These decreases in mean and median reimbursement in the MICA group were also evident in the ICDT group, although costs were not as high as in the former. Reimbursement for all services declined from a mean of \$7000 in the year prior to admission to \$4800 in the year after discharge. As in the MICA group, there were declines in reimbursement for emergency medical services, psychiatric hospitalization, and outpatient services, although mean reimbursement for inpatient hospitalization increased from \$4000 in the year prior to admission to \$4500 in the year after discharge. For total costs by categories, again all declined except medications and nursing homes, plus in the ICDT group substance abuse treatment.

Figure 6 displays the total reimbursement for Medicaid services in the year prior to admission and the year after discharge. In the MICA group, the total reimbursement for all services in the year prior to discharge was approximately \$5 million as seen in the first panel of the figure. In the year after discharge, the expenditure for the MICA group was \$2.8 million, a 45% reduction. Also of note was the dramatic reduction in expenditures for psychiatric hospitalization from \$1.5 million to \$0.4 million. There were also less dramatic declines in costs of emergency medical services (\$0.5 to \$0.3 million) and inpatient hospitalization (\$0.5 to \$0.4 million). The decrease of expenditures in the ICDT group was less dramatic in that overall costs decreased from \$3.8 million in the year prior to admission to \$2.7 million in the year after discharge. However, it is important to recognize that overall expenditures were lower in the ICDT group. There were also decreases in the cost of emergency medical services (\$0.6 to \$0.4 million), psychiatric hospitalization (\$0.8 to \$0.4 million), and inpatient hospitalization (\$0.9 to \$0.7 million).

Costs of inpatient treatment in TARGET. The costs of inpatient treatment in TARGET were examined by modality using daily rates listed in Table 14. For the MICA and ICDT groups, the total costs in 1997 dollars of differential diagnosis and intensive inpatient modalities decreased from the year prior to admission to the year after discharge. However, in

the MICA group, there was an increase in the total costs of MICA residential and residential services during that same period (Table 15). This reflects clients who were readmitted to PCN or other residential facilities in the year after discharge. It is noteworthy that a small proportion of ICDT clients were in MICA residential programs in the year prior to admission to PCN. As in the MICA group, costs for ICDT clients in the first year increased for residential treatment, defined as long term residential, recovery house, or extended care modalities (Table 16). The important result is that costs for all in patient services declined from the year prior to admission to 2 years after discharge.

Table 12
Reimbursement for Medicaid Services-MICA

Service	Total(\$)	Mean(\$)	SD(\$)	Median(\$)	N
Emergency medical					
1 year before	467,644	1321.03	2054.79	768.43	354
1 year after	260,642	961.78	1562.04	417.58	271
2 years after	94,993	753.91	1168.71	355.21	126
3 years after	28,646	596.79	848.23	311.22	48
Medications					
1 year before	623,084	1303.52	1626.71	781.20	478
1 year after	726,981	1553.38	1852.10	897.46	468
2 years after	434,637	1530.41	2034.78	787.66	284
3 years after	143,616	1148.93	1438.86	647.39	125
Detox					
1 year before	2273	757.59	776.22	536.32	3
1 year after	631	315.43	399.49	315.43	2
2 years after	0				0
3 years after	1826	1825.83			1
Psychiatric hospitalization					
1 year before	1,483,264	6534.20	5796.69	4356.39	227
1 year after	430,981	5525.40	5557.75	3898.90	78
2 years after	135,832	5433.29	4980.82	3949.58	25
3 years after	9164	4581.88	1597.74	4581.88	2
Substance abuse					
1 year before	76,862	505.67	550.03	229.21	152
1 year after	59,795	548.58	580.29	342.76	109
2 years after	31,088	690.84	734.28	345.12	45
3 years after	7068	371.98	363.26	214.48	19
Mental health					
1 year before	609,045	2548.31	3847.83	838.90	239
1 year after	126,243	895.34	1711.87	155.99	141
2 years after	7094	154.21	236.26	67.94	46
3 years after	1058	107.76	80.42	94.22	14
Inpatient medical hospitalization					
1 year before	503,579	2595.77	5537.64	451.79	194
1 year after	347,935	3586.96	8689.12	611.42	97
2 years after	90,249	2578.53	4647.72	693.58	35
3 years after	43,726	7287.69	9421.65	4299.93	6
Outpatient medical					
1 year before	1,202,618	2904.87	4989.03	730.11	414
1 year after	747,552	1916.80	3987.81	465.81	390
2 years after	237,878	1177.61	3024.60	298.40	202
3 years after	56,692	636.99	1790.88	175.25	89
Nursing home					
1 year before	21,470	4293.98	8084.88	100.04	5
1 year after	49,322	6165.20	8514.82	3074.26	8
2 years after	0				0
3 years after	0				0
All					
1 year before	4,989,840	10,121.38	10207.19	6946.36	493
1 year after	2,750,083	5681.99	8330.23	2969.42	484
2 years after	1,031,770	3462.31	5362.93	1662.93	298
3 years after	292,246	2197.34	3873.21	1139.57	133

Table 13
Reimbursement for Medicaid Services-ICDT

Service	Total(\$)	Mean(\$)	SD(\$)	Median(\$)	N
Emergency medical					
1 year before	593,221	1461.13	2291.99	704.80	406
1 year after	423,434	1169.71	1932.42	578.21	362
2 years after	228,173	1253.70	2704.94	533.23	182
3 years after	69,444	1021.09	2319.83	379.10	68
Medications					
1 year before	397,701	851.61	1346.58	411.08	467
1 year after	441,076	869.97	1485.09	384.68	507
2 years after	271,032	937.83	1364.78	453.48	289
3 years after	75,647	605.18	837.97	258.10	125
Detox					
1 year before	34,991	1206.59	1378.04	708.89	29
1 year after	9950	765.36	572.82	694.73	13
2 years after	4622	1540.71	1164.85	1261.87	3
3 years after	1285	1285.25			1
Psychiatric hospitalization					
1 year before	818,057	6817.15	7251.90	4348.90	120
1 year after	231,964	4217.53	2900.58	3935.59	55
2 years after	92,050	4184.11	3891.71	3893.19	22
3 years after	3817	3817.14			1
Substance abuse					
1 year before	77,798	559.70	650.96	305.32	139
1 year after	80,219	612.36	669.33	337.79	131
2 years after	33,551	550.02	597.84	354.63	61
3 years after	4229	302.06	328.29	133.28	14
Mental health					
1 year before	175,216	1233.91	2301.03	320.42	142
1 year after	41,645	484.25	1057.80	129.81	86
2 years after	6848	207.52	296.91	70.27	33
3 years after	570	71.29	73.97	36.27	8
Inpatient medical hospitalization					
1 year before	901,484	4006.60	8964.77	1496.17	225
1 year after	704,254	4543.58	7663.78	2130.40	155
2 years after	362,197	4894.55	8912.57	1853.55	74
3 years after	151,553	6062.10	7811.08	2074.03	25
Outpatient medical					
1 year before	771,906	1696.50	3636.01	477.03	455
1 year after	700,016	1461.41	3124.21	387.42	479
2 years after	238,572	989.93	1708.09	279.53	241
3 years after	59,825	592.32	1133.46	164.22	101
Nursing home					
1 year before	73,239	5633.79	6280.81	3810.76	13
1 year after	90,211	7517.57	9760.10	3941.47	12
2 years after	40,888	6814.60	5997.63	5748.21	6
3 years after					0
All					
1 year before	3,843,613	7065.47	10534.32	3343.62	544
1 year after	2,722,769	4768.42	8023.33	2057.10	571
2 years after	1,277,934	3920.04	6975.39	1752.85	326
3 years after	366,360	2458.79	4889.16	607.35	149

Table 14
Daily Rates-1997

Modality	Rates per day
Differential diagnosis	\$84.68
Intensive inpatient	\$61.55
MICA residential	\$78.23
Residential	
Recovery house	\$35.22
Extended care	\$28.18
Long term	\$48.45

Table 15
Costs of Alcohol and Substance Abuse Treatment-MICA

Modality	Total(\$)	Mean(\$)	SD(\$)	Median(\$)	N
Differential diagnosis					
1 year before	43,364	3097	5645	2032	14
1 year after	6003	1501	1068	1510	4
2 years after	1346	1346			1
3 years after	0				0
Intensive inpatient					
1 year before	33,152	2368	2595	1295	14
1 year after	6326	1581	483	1380	4
2 years after	1702	1702			1
3 years after	857	856			1
MICA residential					
1 year before	8752	3786	2602	3135	17
1 year after	29,879	7652	6441	5225	53
2 years after	17,905	9150	5911	8113	10
3 years after	537	537			1
Residential*					
1 year before	9690	2914	2190	2800	40
1 year after	15,182	3498	2762	2848	51
2 years after	6969	2897	1764	2849	17
3 years after	4931	3212	2430	3212	2

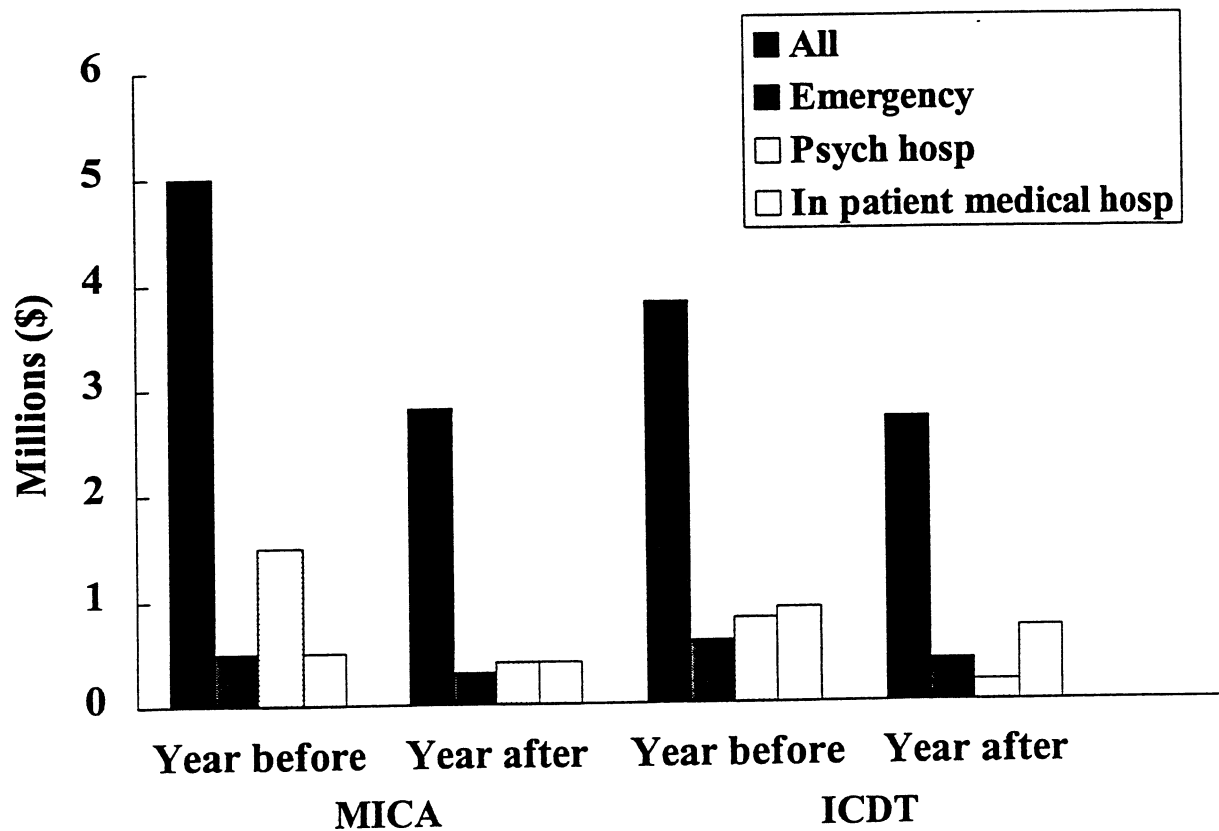
* Includes Long Term Residential, Recovery House, and Extended Care modalities.

Table 16
Costs of Alcohol and Substance Abuse Treatment-ICDT

Modality	Total(\$)	Mean(\$)	SD(\$)	Median(\$)	N
Differential diagnosis					
1 year before	27,159	1940	1405	2038	14
1 year after	12,254	4084	2682	2540	3
2 years after	1849	1849			1
3 years after	0				0
Intensive inpatient					
1 year before	6078	1217	1019	1283	62
1 year after	5529	1375	1003	1288	24
2 years after	3251	1660	570	1704	11
3 years after	1241	1106	216	1221	3
MICA residential					
1 year before	26,274	7242	5714	5541	43
1 year after	25,284	8734	6964	5535	31
2 years after	12,882	6008	4647	5235	8
3 years after	2029	2029			1
Residential*					
1 year before	10,944	2091	2055	1826	109
1 year after	33,748	3566	3600	2798	145
2 years after	8257	3018	1859	2852	55
3 years after	4692	1978	1404	2115	11

* Includes Long Term Residential, Recovery House, and Extended Care modalities.

Figure 6
Total Reimbursement for Medicaid Services



Program completion and service utilization

In addition to describing utilization and costs of services, this report examined whether program completion or non-completion at PCN was associated with different patterns of subsequent service utilization. Discharge status was defined in the PCN database for each patient discharged from the MICA or ICDT programs at PCN. For purposes of this analysis, discharge status was defined as complete or not complete. Major reasons for not completing the program included non compliance, left against medical advice, and relapse. We examined the proportion of patients using various services at any time after discharge. Services were categorized as detox, outpatient substance abuse, mental health crisis, emergency medical, psychiatric hospitalization, and general medical inpatient hospitalization. Unfortunately, it was not possible to identify specific community mental health outpatient utilization from the information provided by the MHD. With the exception of outpatient services, the above services are costly and sometimes represent relapses with respect to the use of alcohol or other substances, or crises with respect to the underlying mental illness. Use of outpatient services, on the other hand, may indicate that the individual is taking the necessary actions to receive appropriate treatment for the substance abuse-dependence and/or the underlying mental illness.

If patients had successfully completed the program at PCN, one would hope that the use of outpatient services would be higher, and the use of crisis and inpatient services lower, than for those who did not complete treatment. The results of Table 17 support this general hypothesis. In the MICA group, 32% completed the PCN program; these individuals had significantly higher use of outpatient services, and lower utilization of mental health crisis and emergency medical services. The univariate p value indicates these results were statistically significant, as does the multivariate p value. Logistic regression was used to adjust for differences in baseline characteristics between those who completed and those who did not complete the MICA program. There was little difference between the univariate and multivariate p values indicating that differences between the completers and non completers had little effect on the overall association between program completion and utilization after discharge. In the MICA group, 16% of the completers had a psychiatric hospitalization as opposed to 26% of those not completing the program. The use of detox services and inpatient hospitalization was similar in the two groups.

In the ICDT group, where 75% of individuals completed the program, the differences between completers and non completers were not as definite as in the MICA group. As with MICA, all differences were in the expected direction, but fewer of them were statistically significant. Consistent with findings in the MICA group, those in the ICDT group who completed the program had increased use of outpatient services and decreased use of mental health crisis services, although the latter result was no longer statistically significant after multivariate adjustment. The use of detox, mental health crisis, and psychiatric hospitalization services were similar in the two groups. However, inpatient hospitalization for general medical reasons occurred less frequently in the group that completed treatment (22%) compared to the group not completing treatment (30%).

Table 17
Program Completion Status and Utilization

Service	Completed (n=170)	Not Completed (n=364)	P*	P**
MICA (n=534)				
Detox	13%	17%	0.23	0.25
Outpatient services (substance abuse)	29%	19%	0.008	0.0008
Crisis (mental health)	31%	51%	<0.0001	<0.0001
Emergency medical	47%	64%	<0.0001	0.0001
Psychiatric hospitalization	16%	26%	0.014	0.045
Inpatient hospitalization	15%	18%	0.29	0.39
ICDT (n=735)				
	Completed (n=552)	Not Completed (n=183)		
Detox	33%	38%	0.21	0.30
Outpatient services (substance abuse)	37%	22%	<0.0001	<0.0001
Crisis (mental health)	27%	37%	0.009	0.14
Emergency medical	55%	59%	0.40	0.99
Psychiatric hospitalization	12%	17%	0.07	0.16
Inpatient hospitalization	22%	30%	0.028	0.018

* By chi-square

** By multivariate stepwise logistic regression

Intensity of case management and utilization

There was interest in determining whether involvement of the outside (community program) case manager had any influence on utilization of services after discharge from PCN. Charts at PCN were reviewed to assess the level of contact between clients and outside case managers during the stay at PCN. Involvement was assessed on a 5 point scale from none to extensive for 34 individuals in the MICA and 40 in the ICDT groups. Case manager involvement was judged to be extensive in 24% and 25% of MICA and ICDT clients, respectively. The association between case management intensity and utilization of services described in the previous section was examined. In no case was there a statistically significant ($p < 0.05$) association between intensity of involvement and utilization of services, although the sample sizes were so small that there was limited ability to detect statistically significant differences. The small sample size was the result of an error in identifying clients who appeared in the PCN database, but had yet to be discharged at the time we received the database. Most patients identified were those who had not been discharged and consequently do not appear in this report.

Do diagnostic judgements change between admission and discharge?

MICA program. In order to answer this question, all stays from 6/2/95 (when PCN began recording diagnostic information in the database) were examined; those episodes with one or more diagnoses at admission and/or discharge were included in the analysis, which contains 238 discharges. The mean number of psychiatric and chemical dependency diagnoses was 4.7 ± 2.1 per admission (range 1-10). Individual diagnoses were categorized by DSM-III diagnosis codes. These codes were aggregated into major psychiatric and chemical dependency categories listed in appendix Table B1.

Table 18 is a summary table displaying the proportion of discharges with a given diagnosis at admission and discharge for clients in the MICA program. This table shows that, except for dysthymia, which increased considerably, there was very little change in the overall rates at which psychiatric diagnoses are made, and such changes represented both increases and decreases. There appears to be no general pattern of increases or decreases in the rates at which mental illnesses were diagnosed.

The same was not true for alcohol and drug diagnoses. Nearly all of the diagnoses for both dependence and abuse showed statistically significant declines in frequency from admission to discharge. The only notable exception was the large increase in the diagnosis of polysubstance dependence.

Table 19 displays raw numbers and shows the overall agreement between admission and discharge diagnoses of mental illness for individuals. These tables are addressing the question of whether each person is given the same diagnoses at admission and discharge. The kappa statistic was used as the statistical measure of agreement between admission and discharge diagnoses across the whole set of clients. Kappas are interpreted roughly as correlations. All of these values are highly statistically significant; however, none of them rise to the range normally considered desirable for reliabilities (i.e., at least .70, preferably .80), although two come close. A similar pattern occurs in Table 20 for the reliabilities of the substance dependence diagnoses.

These values are highly statistically significant, but are lower in value, and are less satisfactory as reliabilities.

Table 21 provides more detail concerning admission and discharge diagnoses; the rows display the distribution of discharge diagnoses for patients who had a given admission diagnosis. The OTHR category includes all other psychiatric diagnoses that do not fall into the 7 major categories. The NONE category refers to those admissions or discharges for which there was no psychiatric diagnostic code listed; this could include a deferred diagnosis. Again, these data were for admissions (some patients have more than one) and for each admission there may have been multiple admission and/or discharge diagnoses, leading to multiple entries in the tables for each client.

The predominant psychiatric diagnoses were personality disorders, schizophrenia, major depression, post traumatic shock, and psychotic disorders; agreement was best for schizophrenia and worst for dysthymia, although measures of agreement were statistically significant for all diagnostic categories.

For MICA patients, alcohol was the predominant substance associated with dependence or abuse (Table 18). Cannabis, nicotine, cocaine, opioid, amphetamine, and sedative dependencies were also of significance. Of considerable interest, was the increase in diagnosis of polysubstance dependence from 8.4% at admission to 33.6% at discharge. At discharge, there were statistically significant reductions in the use of all substances with the exception of hallucinogens and inhalants, which were seldom used. Diagnoses of abuse were found less often than those of dependence. As was the case with psychiatric diagnoses, there was statistically significant agreement between admission and discharge diagnostic categories for alcohol and drugs, but the values were too low to be considered good reliabilities (Table 20).

ICDT program. For ICDT discharges there were 4.5 ± 2.1 diagnoses per admission, although a much smaller proportion of patients had psychiatric diagnoses (Table 22). There was an increase in the use of personality and dysthymic disorder diagnoses. Again, agreement between admission and discharge categories was statistically significant for all diagnostic categories (Table 23), but, except for one, fell short of desirable levels for reliabilities. Over half of ICDT discharges had no admission diagnosis of mental illness, and at discharge 39% still had no diagnosis of mental illness (Table 24).

At discharge, there were declines in the use of all categories of chemical dependency except hallucinogens and inhalants, and, again, a large increase in the diagnosis of polysubstance dependence (Table 22). Agreement between admission and discharge categories was statistically significant for all categories (Table 25), but again had low reliability.

Table 18
Admission and Discharge Diagnoses
MICA Discharges (n=238)

Psychiatric Diagnosis	Admission	Discharge	P*
Personality disorder	32.8%	29.4%	NS
Schizophrenia	30.3%	30.7%	NS
Major depressive episode	21.4%	26.5%	NS
Bipolar	14.3%	20.6%	NS
Post traumatic shock disorder	14.7%	14.3%	NS
Psychotic disorder	4.2%	5.5%	NS
Dysthymic disorder	4.2%	10.1%	0.01
Alcohol or Drug Diagnosis			
Alcohol dependence	74.8%	58.4%	0.002
Opioid dependence	22.3%	11.3%	0.001
Sedative dependence	12.2%	2.1%	<0.0001
Cocaine dependence	37.0%	21.8%	0.0003
Cannabis dependence	42.9%	16.8%	<0.0001
Amphetamine dependence	16.8%	6.3%	0.0003
Hallucinogen dependence	3.4%	1.3%	0.13
Inhalant dependence	0.4%	2.1%	0.10
Polysubstance dependence	8.4%	33.6%	<0.0001
Other or unknown substance dependence	5.9%	0.8%	0.002
Nicotine dependence	44.5%	5.0%	<0.0001
Alcohol abuse	5.0%	1.3%	0.02
Sedative abuse	3.4%	0.0%	0.004
Cannabis abuse	7.1%	3.8%	NS
Hallucinogen abuse	8.8%	0.0%	<0.0001
Opioid abuse	6.7%	0.4%	0.0002
Cocaine abuse	5.5%	1.7%	0.03
Amphetamine abuse	6.3%	0.4%	0.0004
Other or unknown substance abuse	12.6%	0.4%	<0.0001

*By test of 2 proportions

NS=not statistically significant, $p > 0.05$

Table 19
Admission and Discharge Psychiatric Diagnoses
MICA Discharges (n=238)

Admission Diagnosis	Discharge Diagnosis		% agree	Kappa	P*
	Yes	No			
Personality Disorder	Yes	No	71%	0.33	<0.0001
	40	38			
	No	30	130		
Schizophrenia	Yes	No	85%	0.65	<0.0001
	55	17			
	No	18	148		
Major Depressive Disorder	Yes	No	80%	0.45	<0.0001
	33	30			
	No	18	157		
Bipolar	Yes	No	89%	0.64	<0.0001
	29	5			
	No	20	184		
Post Traumatic Shock Disorder	Yes	No	85%	0.41	<0.0001
	17	18			
	No	17	186		
Psychotic Disorder	Yes	No	96%	0.41	<0.0001
	5	5			
	No	8	220		
Dysthymic Disorder	Yes	No	90%	0.25	<0.0001
	5	5			
	No	19	209		

*By Kappa Statistic

Table 20
Admission and Discharge Alcohol and Substance Abuse Diagnoses
MICA Discharges (n=238)

		Discharge Diagnosis		% agree	Kappa	P*
Admission Diagnosis						
Alcohol Dependence	Yes	No		74%	0.42	<0.0001
	Yes	127	51			
	No	12	48			
Opioid Dependence	Yes	No		87%	0.56	<0.0001
	Yes	25	28			
	No	2	183			
Sedative Dependence	Yes	No		88%	0.15	<0.0001
	Yes	3	26			
	No	2	207			
Cocaine Dependence	Yes	No		76%	0.45	<0.0001
	Yes	42	46			
	No	10	140			
Cannabis Dependence	Yes	No		68%	0.29	<0.0001
	Yes	33	69			
	No	7	129			
Amphetamine Dependence	Yes	No		86%	0.34	<0.0001
	Yes	11	29			
	No	4	194			
Polysubstance Dependence	Yes	No		71%	0.21	<0.0001
	Yes	16	4			
	No	64	154			

*By Kappa Statistic

Table 21
Comparison of Admission and Discharge Diagnosis
MICA Discharges (n=238)

Admit DX (n)	Discharge DX								
	SCHZ	BIP	DEPR	PSYCH	PERS	DIS	PTSD	OTHR	NONE
SCHZ (72)	76%	10%	6%	7%	15%	1%	3%	8%	0%
BIP (34)	6%	85%	3%	3%	24%	12%	6%	12%	0%
DEPR (51)	10%	10%	65%	4%	33%	20%	14%	26%	2%
PSYCH (10)	30%	10%	10%	50%	20%	0%	0%	10%	0%
PERS (78)	27%	22%	35%	5%	51%	8%	15%	17%	1%
DIS (10)	0%	10%	50%	0%	30%	50%	30%	10%	10%
PTSD (35)	3%	17%	49%	3%	37%	26%	49%	20%	3%
OTHR (46)	15%	17%	28%	4%	28%	4%	9%	59%	2%
NONE (24)	25%	17%	33%	0%	38%	8%	25%	8%	8%
ALL	31%	21%	26%	6%	29%	10%	14%	20%	2%

DX=diagnosis; SCHZ=schizophrenia; BIP=bipolar; DEPR=major depressive disorder;
 PSYCH=psychotic disorder; PERS=personality disorder; DIS=disthymia; PTSD=post traumatic
 shock disorder; OTHR=other psychiatric diagnosis

Table 22
Admission and Discharge Diagnoses
ICDT Discharges (n=354)

Psychiatric Diagnosis	Admission	Discharge	P*
Personality disorder	8.8%	20.9%	<0.0001
Schizophrenia	8.8%	7.9%	NS
Major depressive episode	16.9%	18.6%	NS
Bipolar	6.8%	7.3%	NS
Post traumatic shock disorder	9.6%	9.3%	NS
Psychotic disorder	0.0%	1.1%	0.04
Dysthymic disorder	2.5%	9.3%	0.0001
Number Psychiatric Diagnoses			0.0004
None	52.0%	38.7%	
One	33.9%	38.4%	
Two or more	14.1%	22.9%	
Alcohol or Drug Diagnosis			
Alcohol dependence	91.8%	87.9%	NS
Opioid dependence	33.6%	22.6%	0.001
Sedative dependence	15.3%	8.2%	0.003
Cocaine dependence	36.2%	24.3%	0.006
Cannabis dependence	41.2%	24.9%	<0.0001
Amphetamine dependence	22.3%	13.8%	0.003
Hallucinogen dependence	2.5%	2.5%	NS
Inhalant dependence	1.4%	0.6%	NS
Polysubstance dependence	4.2%	24.0%	<0.0001
Other or unknown substance dependence	7.1%	0.0%	<0.0001
Nicotine dependence	64.1%	34.5%	<0.0001
Alcohol abuse	4.0%	3.4%	NS
Sedative abuse	5.4%	3.1%	NS
Cannabis abuse	11.9%	5.9%	0.006
Hallucinogen abuse	7.9%	3.1%	NS
Opioid abuse	4.8%	2.5%	NS
Cocaine abuse	7.3%	4.8%	NS
Amphetamine abuse	5.6%	3.1%	NS
Other or unknown substance abuse	18.9%	1.1%	<0.0001

*By test of 2 proportions

NS=not statistically significant, $p > 0.05$

Table 23
Admission and Discharge Psychiatric Diagnoses
ICDT Discharges (n=354)

Admission Diagnosis	Discharge Diagnosis		% agree	Kappa	P*
	Yes	No			
Personality Disorder	Yes	No	84%	0.40	<0.0001
	25	6			
	No	49	274		
Schizophrenia	Yes	No	96%	0.72	<0.0001
	22	9			
	No	6	317		
Major Depressive Disorder	Yes	No	85%	0.50	<0.0001
	37	23			
	No	29	265		
Bipolar	Yes	No	93%	0.48	<0.0001
	13	11			
	No	13	317		
Post Traumatic Shock Disorder	Yes	No	91%	0.49	<0.0001
	18	16			
	No	15	305		
Psychotic Disorder	Yes	No	99%	-----	-----
	0	0			
	No	4	350		
Dysthymic Disorder	Yes	No	92%	0.31	<0.0001
	7	2			
	No	26	319		

*By Kappa Statistic

Table 24
Comparison of Admission and Discharge Diagnosis
ICDT Discharges (n=354)

Admit DX (n)	Discharge DX								
	SCHZ	BIP	DEPR	PSYCH	PERS	DIS	PTSD	OTHR	NONE
SCHZ (31)	71%	10%	10%	0%	19%	10%	6%	19%	3%
BIP (24)	4%	54%	4%	8%	33%	4%	12%	25%	4%
DEPR (60)	0%	5%	62%	2%	22%	12%	13%	12%	12%
PSYCH (0)	-----	-----	-----	-----	-----	-----	-----	-----	-----
PERS (31)	6%	13%	19%	0%	81%	23%	13%	29%	1%
DIS (9)	0%	0%	22%	0%	44%	78%	11%	11%	0%
PTSD (34)	6%	15%	26%	6%	29%	9%	53%	29%	0%
OTHR (36)	17%	3%	14%	0%	19%	6%	8%	61%	17%
NONE (184)	2%	4%	9%	0%	13%	7%	5%	8%	66%
ALL	8%	7%	19%	1%	21%	9%	9%	17%	39%

DX=diagnosis; SCHZ=schizophrenia; BIP=bipolar; DEPR=major depressive disorder;
 PSYCH=psychotic disorder; PERS=personality disorder; DIS=disthymia; PTSD=post traumatic
 shock disorder; OTHR=other psychiatric diagnosis

Table 25
Admission and Discharge Alcohol and Substance Abuse Diagnoses
ICDT Discharges (n=354)

Admission Diagnosis		Discharge Diagnosis		% agree	Kappa	P*
		Yes	No			
Alcohol Dependence	Yes	304	21	92%	0.57	<0.0001
	No	7	22			
Opioid Dependence	Yes	74	45	86%	0.65	<0.0001
	No	6	229			
Sedative Dependence	Yes	24	30	90%	0.53	<0.0001
	No	5	295			
Cocaine Dependence	Yes	76	10	82%	0.59	<0.0001
	No	52	216			
Cannabis Dependence	Yes	79	67	79%	0.53	<0.0001
	No	9	199			
Amphetamine Dependence	Yes	44	35	89%	0.62	<0.0001
	No	5	270			
Polysubstance Dependence	Yes	10	5	77%	0.14	<0.0001
	No	75	264			

***By Kappa Statistic**

Length of stay

Admissions were divided into groups depending on date of admission, and mean length of stay and the proportion of MICA patients staying more than 180 days was examined for each time period. For MICA patients, mean length of stay has fluctuated some, but not much in comparison to the standard deviation (Table 26). The variability (standard deviation) of the lengths of stay has been declining over time, suggesting increased program stability. Median lengths of stay increased after the first 3 months, but have been stable since. (Information for admissions after July 1996 are not included, since many of these clients had not been discharged by the time these data were received in March 1997). The proportion of patients staying longer than 180 days also varied, although there did not appear to be a trend toward longer stays. The proportion of patients judged to have successfully completed the program increased steadily from 20% in the early months to over 40% in the later months.

The results for the ICDT program were relatively stable (Table 27). Since this program has a fixed length of stay of 60 days for first admissions, there were only 3 admissions that exceeded 180 days. By definition, program completion rates were relatively high.

Table 26
Length of Stay by Admission Period-MICA

Admission period	Mean LOS (days)	Median LOS (days)	% > 180 days	% completed program	N
7/94-9/94	86±111	50	14.6%	19.5%	82
10/94-12/94	104±102	76	10.0%	33.3%	60
1/95-6/95	110±112	81	19.4%	34.3%	108
7/95-12/95	95±81	71	13.8%	36.8%	87
1/96-6/96	82±63	76	8.6%	40.0%	105

Table 27
Length of Stay by Admission Period-ICDT

Admission period	Mean LOS (days)	% completed program	N
7/94-9/94	58±26	83.7%	98
10/94-12/94	64±26	63.0%	92
1/95-6/95	65±30	77.4%	177
7/95-12/95	68±36	72.1%	129
1/96-6/96	71±31	77.7%	121
7/96-current	62±25	74.6%	118

In-Migration to Skagit County

One of the concerns expressed by sponsors of this evaluation is the perception that individuals remain in Skagit County after discharge from PCN and place additional demands on county personnel and services. In order to assess this matter, Medicaid utilization data were examined to determine the county where the first service within 30 days of discharge was obtained. Results are reported separately for MICA and ICDT clients who received services within 30 days of discharge. For comparison purposes, the referral county as reported by PCN is displayed as is the county where the last Medicaid service prior to PCN admission was received. For the MICA group, there appeared to be some in-migration in that the percent of individuals receiving services in Skagit County increased from 5% in the period prior to admission to 11% after discharge (Table 28). There was also a modest increase in Whatcom County (5% to 8%) to the north of Skagit and a very slight increase in Snohomish County (6% to 7%) to the south of Skagit. For the ICDT group, in-migration was again apparent for Skagit (10% to 14%) and Whatcom (9% to 13%) counties, but not Snohomish (Table 29). King County may also have received additional clients (13% to 17%).

Table 28
Client Migration-MICA

County	Referring county (n=534)	Last service prior to admission (n=493)	First service after discharge (n=407)
Clark	4%	4%	3%
Cowlitz	1%	1%	1%
Kitsap	2%	1%	1%
Pierce	12%	12%	8%
Skagit	4%	5%	11%
Snohomish	9%	6%	7%
Spokane	8%	7%	5%
Thurston	5%	4%	4%
Whatcom	2%	5%	8%
King	32%	36%	37%
All others	21%	17%	14%
Out of state	0%	2%	1%

Table 29
Client Migration-ICDT

County	Referring county (n=735)	Last service prior to admission (n=545)	First service after discharge (n=417)
Clark	5%	5%	5%
Cowlitz	9%	8%	8%
Kitsap	4%	4%	3%
Pierce	21%	17%	14%
Skagit	11%	10%	14%
Snohomish	7%	6%	6%
Spokane	10%	11%	6%
Thurston	2%	1%	1%
Whatcom	7%	9%	13%
King	7%	13%	17%
All others	17%	14%	12%
Out of state	0%	2%	1%

SUMMARY

Major Findings

- At baseline, patients in both MICA and ICDT had significant medical problems associated with their underlying psychiatric and substance abuse problems.
- In comparison to the general US population, age adjusted mortality after discharge was almost 2 times greater in the MICA group and 4 times higher in the ICDT group.
- Continuity of care is best for clients leaving the MICA program and re-entering community mental health services. Overall, more clients received Medicaid support than any other type of service, but most clients received more than one type of service both before and after PCN.
- From the period prior to admission to PCN to 3 years after discharge, there were significant declines in utilization of substance abuse, community mental health, and Medicaid services.
- There were dramatic declines in the utilization of costly acute services including detox, mental health crisis, and emergency medical services, as well as psychiatric hospitalizations.
- From the year prior to admission to the year after discharge, overall Medicaid costs dropped 45% in the MICA group and 29% in the ICDT group.
- Individuals who successfully completed their respective programs were less likely to use costly acute services and were more likely to use outpatient substance abuse services.
- About 30% of both groups worked after discharge but median earnings for those working were less than \$1000 per person per year.
- There was minimal involvement with vocational rehabilitation services.
- Rates of psychiatric diagnosis did not change from admission to discharge, but the reliability of these diagnoses was not high.
- Rates of most substance dependence/abuse diagnoses declined during the PCN stay. Polysubstance abuse was diagnosed more frequently at discharge from PCN. The reliability of these diagnoses was not high.
- Length of stay for MICA patients has stabilized over the last 2 years of the program.
- After discharge, some patients not originally from Skagit County appear to have remained in the county for at least 30 days.

Comment

This evaluation has demonstrated significant decreases in the use of costly acute care services, which are often indicative of detrimental changes in the underlying mental illness and/or substance abuse problem. It appears that individuals who successfully completed their respective programs at PCN were less likely to use these services. We also find general declines in all types of service utilization over a three year period from discharge from PCN programs. Because of study design weaknesses, we are not able to say that the programs caused these changes. However, these results suggest that treatment received at PCN was associated with declines in the use of these costly services.

The interpretation of the desirability of these results is not so simple. In attempting to understand what they mean, there are at least three levels of consideration.

Ultimately, the judgement of desirability rests on the policies underlying the treatment system. Technically policy is set by legislatures, codified by executive branch organizations such as DSHS, and implemented by local service providers. There are ample opportunities both within and between these levels for policies to be ambiguous, contradictory, or even unstated. Yet it is the policies that ought to determine the criteria by which the success of a community program should be judged, both in terms of the client target population to be served and outcomes.

One area that policy impacts, both explicitly and implicitly, is the expectation about the pattern of services to be provided. At one time mental health professionals expected that persons with severe and persistent mental illnesses would be retained in fairly active treatment over prolonged periods of time. Under managed care this expectation may have changed. Chemical dependency treatment is generally expected to be time limited, and possibly episodic. Once clients respond to treatment, it is believed that they will be able to maintain use-free, socially productive lives with the assistance of self help groups such as AA, although it is accepted that there may be relapses requiring new episodes of treatment.

This pattern of services makes sense for clients who have relatively stable work and social environments to which they can return. Severely and multiply disabled clients, such as those served by the PCN programs, generally have no work histories or skills, lack other personal skills and physical resources, and often have no families or abuse-free social settings available. For such persons, it is reasonable to ask whether service programs need to be organized differently in order to attain successful outcomes. Changes to consider would include greater program intensity, breadth, and duration. Any such consideration of program change should begin by deciding what the treatment goals are for these clients. But however desirable program expansion might be from a humanitarian position, the reality is that resources are limited, and the major decisions must be made at the policy level about what service patterns and what outcomes are realistic.

Are the data in this study sufficient to indicate whether the observed declines in services across time are desirable? Unfortunately, no, and the implications available are mixed. First we should reiterate that the decline is consistent across substance abuse, mental health, and

Medicaid services. This degree of pervasiveness, especially since it includes medical services, would seem to suggest a successful intervention. In addition, the particularly large declines in crisis, emergency and inpatient services seem desirable, and the relative increases in outpatient services for those who complete treatment are positive. However, the decline in medical care is surprising, given poor health and high death rates generally in the groups. Also, we are not able to tell whether these data are affected by either the move in Medicaid toward managed care, or by the removal of alcohol and drug abuse disabled persons from Title XIX roles, so it may be that the Medicaid data are incomplete. Arguing against improvement is the fact that we do not see increases in earned income, either in the percent of clients with earnings (around 29% both before and after) or in the median income per working client (which in fact declined), nor do we see many clients applying for vocational rehabilitation services that might be helpful for attaining independence. Taken together, these data do not lead to a clear indication of whether or not clients' conditions improved.

Any of several types of data would be helpful in clarifying this issue. First, it would be extremely useful to have data from a comparison or control group, or at least an expectation based on accumulated treatment experience either from PCN or other sources. Second, preferably in addition to the first, it would be useful to have a clearly stated judgement from PCN about clients' needs for further treatment. Third, it would be helpful (but costly) to have data from the clients themselves about their levels of substance use, symptoms, social adjustment, and housing and health status (as well as public safety data from archival sources).

Finally, we should note that an alternative model for outcome is one based on "Continuous Quality Improvement" principles, in which a set of outcomes are monitored over time, generally along with some control variables such as case mix, and the program is continually modified in ways to try to improve performance on the set of outcomes. In this case control groups become irrelevant, and the point is to improve performance, i.e., compare the program to itself over time. It would be our recommendation that some standards be developed for determining need for referral upon discharge from PCN, and that for those clients needing referral, the success rate of referral be monitored as one of the indicators of PCN success. Since completing a referral is a joint process, both PCN and the agencies to which the referrals are made should share responsibility for making successful connections.

Limitations

This evaluation had weaknesses with respect to design and conception, data quality, and data gaps.

There were three major design or conceptual problems. First, the lack of a control group meant that we could not be certain that the changes observed over time were due to treatment, rather than some other process, such as maturation or return to baseline levels, that might occur even in the absence of treatment. Second, we have no knowledge of the level of need for treatment that clients had at discharge from PCN or over time thereafter. Therefore, we cannot know whether the reductions in services were appropriate or not; that is, whether clients were getting better, giving up on the treatment system, or even being excluded from it. Finally, we have no way of knowing whether the clients who were not receiving services were still in-state,

or whether they had moved to another jurisdiction where they might have received services. In addition, clients could have received services from other providers, such as the Department of Veterans Affairs, that were not included in information systems used for this evaluation.

With respect to data quality, the major limitation was that we received only highly aggregated data on community mental health services utilization from the MHD. These data included hours of outpatient services, but except for crisis services, information about the numbers and types of specific outpatient services was not provided. In addition, details about hospitalization at Western and Eastern State Hospitals were not available. Similarly, data from the DVR consisted of the number of applications for training, but no information on training received or on the outcomes of training was given.

Data gaps were of several types. First, there were no data on substance or alcohol use following discharge. Such data do not exist in archival sources, and would require expensive forms of individualized data collection. But use is probably the most central outcome measure, so a failure to include it, even if based on sound fiscal grounds, is a limitation. Of equal or greater importance was the lack of criminal justice data. We have permission to access Washington State Patrol data, and expect to eventually receive these data, but have not as of this writing. To our knowledge, this is the only source of state-wide arrest data, but we understand it reliably includes only data for gross misdemeanors and felonies. From previous work with persons similar to these, we know that many if not most police contacts are for code violations and misdemeanors, so the WSP data may not include all the activity that is of interest.

Finally, even if the gaps and weaknesses in our data set were repaired, nothing more than a superficial cost analysis can be expected. The basic conceptual problem is that costs are not the equivalent of charges or reimbursements. In addition, there are major practical difficulties, such as the need to (and extreme difficulty of) match Medicaid records with both the DASA and MHD records. The time and effort needed to do this exceeded the resources available for this evaluation.

Future Directions for Evaluation

Any replication or extension of this study should include the following:

- A control or comparison group.
- Utilization of services has been examined, but the clients' needs for services have not been, and they should be assessed.
- Evaluate longer term outcomes for the 1269 individuals in the current evaluation.
- Acquire more detail concerning the types of community mental health services utilization (e.g. medication management, day treatment) and hospitalization at Western or Eastern State.
- Examine misdemeanor and felony arrests records

- In the ICDT group, examine more closely the circumstances that led to civil commitment, in particular whether there were concomitant criminal proceedings.
- Assess housing status in the year after discharge from PCN.
- Examine in more detail the components of treatment offered at PCN and determine if any of these are associated with improved outcomes. Consider aspects of the discharge treatment plan.

Additional suggestions for future evaluation projects have been submitted as a separate document.

Appendix A

Procedures for Classifying and Adjusting Medicaid Expenditures

Procedures for classifying Medicaid expenditures for the evaluation of PCN treatment programs were similar to those used in the SSI project. Table A1 displays criteria used to classify expenditures for medical services received by individuals discharged from PCN. Table A2 displays the distribution of expenditures for individuals discharged from the MICA and ICDT programs. Medical services considered for classification occurred one year prior to PCN admission and for up to 3.5 years after discharge.

In order to determine if individuals discharged from PCN used medical services paid for by Medicaid, a 14 digit patient identification code was provided to the Medical Assistance Administration and matched to identifiers in Medicaid files for the period July 1993 through September 1997. In all 353,236 records were matched; the match rate was 97% for the MICA group and almost 90% for the ICDT program. Those persons not matched may have not been eligible for Medicaid services or may have been “missed” in the matching algorithm. Alternatively, they may have received medical services from other organizations such as the Department of Veterans Affairs.

The following steps were used to classify medical services.

Stage 1: Identification of Prescription Drug Expenditures

Records with a line item of “00” indicated a prescription drug related charge and were classified as such. The distribution of prescription drug expenditures is shown in Table A2.

Stage 2: Identification of Emergency Department (ED)/Crisis Services

Records with any of the characteristics listed in Table A1 under ED/crisis services were identified as primary ED/crisis services. In addition, services provided on the same date as primary emergency/crisis services and billed using the same transaction control number were also classified as emergency services. Finally, all other services provided on the same date as emergency services were classified as emergency.

Stage 3: Identification of detoxification services

All expenditures meeting criteria listed in Table A1 under detox services were classified as primary detox services.

Stage 4: Identification of inpatient psychiatric services

These expenditures classified according to select revenue codes and provider category of service values listed in Table A1. In addition, records with the same transaction control number were also classified as inpatient psychiatric services. Finally, unclassified services provided within the dates of hospitalization were also attributed to psychiatric hospitalization.

Stage 5: Identification of chemical dependency and mental health services

Both assessment and treatment services are listed in the procedure codes listed in Table A1. All records with the same transaction control number that were not previously classified were also determined to be services of this nature.

Stage 6 Classification of general medical expenses as inpatient, outpatient, or nursing home congregate care.

Finally, all Medicaid line items not previously classified as prescription drug, emergency, inpatient psychiatric, detoxification, or other chemical dependency mental health services, were defined as general medical services and were categorized according to whether they were received for in-patient, out-patient, or nursing home congregate care services.

After all classification criteria were employed, 4197 records for MICA and 1137 records for ICDT patients were unclassified (Table A2). Those services provided during as in-patient hospitalization were attributed to that category. The remaining services were assigned to the outpatient category.

Stage 7: Computation of Medicaid Acute Care Medical Expenditures

The amount reimbursed for each type of service was aggregated to the patient level for the year prior to PCN admission and for the time after discharge. All expenditures were adjusted to 1997 dollars. This adjustment was done by tracking changes in the payment amount allowed by Medicaid for a given service over time. Since there are many services and that payment for a given service varies by provider, adjustment is complex. In order to simplify matters, we tracked key services for inpatient hospitalization and outpatient services.

The costs for emergency department/crisis services associated with diagnosis related group (DRG) claims are not included in the estimates of expenditures for these services. With the exception of DRG claims, reimbursements for the medical services are reported on a line item basis. Since DRG claims are reimbursed at a fixed rate, regardless of services provided, reimbursement rates for these claims are not reported at the line item level, only total reimbursement is reported. For this reason, emergency room reimbursement associated with DRG claims could not be separated from the total amount reimbursed. Emergency services with DRG claims invariably are associated with an inpatient hospital admission; hence in these cases the reimbursement for the emergency services is included in the total payment for hospital services. In this report, reimbursement for emergency services only reflects those services that did not result in in-patient hospitalization.

Table A1
Criteria Used to Classify Charges

Services	Value
Emergency department/crisis	
Provider type	18,51,53
Provider category of service	29,76
Provider specialty	37
Admit source	7
Procedure group code	FP, LA,L1
Place of service	5
Revenue code	0450
Procedure codes	0001A,0002A,0004A,0005A,0007A,0008A,0009A, 0010A,0011A,0012A,0020A,0021A,0030A,0031A, 0032A,0034A,0035A,0036A,0037A,0039A,0040A, 0042A,0043A,0044A,0260M,0261M,0511A,90505, 90510,90515,90517,90520,90540,90501,90550,90560, 90570,99064,99065, 99281,99282,99283,99284,99285
Detox	
Procedure codes	0025M, 0026M
Provider specialty	92
Provider category of service	96
Procedure group code	NJ
In-patient psychiatric services	
Revenue code	114, 124,134,204
Provider category of service	1
Chemical dependency services	
Procedure codes	0076M,0077M,0143M,0144M,0145M,0146M, 0147M,0148M,0149M,0153M,0154M,0155M, 0156M,0157M,0158M,0159M,0190M,9005M, 0140M, 0141M,0142M,0150M, 0151M
Mental health services	
Procedure codes	0272M,0273M,0276M,0277M,0278M,0279M,0280M, 0281M,0288M,0503M,0504M,0505M,0506M, 0532M,0533M,0537M,0567M,0568M,0569M, 90841,90843,90844,90862,90882,90889,0070M,0264M, 265M,0267M,0269M,0270M, 0575M, 90801,90820, 9083M, 9084M
Inpatient	
Place of service	1
Claim input form indicator	R,S
Provider category of service	2,3
Out patient	
Place of service	2,3,4
Claim input form indicator	M
Provider category of service	12

Nursing home/congregate care	
Place of service	6,7,8
Claim input form indicator	T
Provider category of service	90,91,93,94

Table A2
Distribution of Medicaid Claims Data

Service	MICA	ICDT
Prescription drugs	42.7%	33.0%
Emergency crisis-primary	9.9%	19.4%
Emergency crisis-same date and transaction number	4.0%	6.9%
Emergency crisis-same date	1.9%	2.6%
Detox	<0.1%	0.2%
Inpatient psychiatric hospitalization	5.0%	3.2%
Chemical dependency	3.7%	4.6%
Mental health	9.7%	3.1%
Inpatient hospitalization	1.3%	2.8%
Outpatient	18.4%	23.0%
Nursing home/congregate care	0.1%	0.2%
Unclassified-assigned to in-patient	0.2%	0.2%
Unclassified-assigned to out-patient	3.1%	0.7%
Number of records	135,399	123,909
Number clients with claims data	519/534	660/735
	(97.2%)	(89.8%)

MICA-Mentally Ill, Chemically Abusing

ICDT-Involuntary Chemically Dependent Treatment Program

Appendix B

Diagnostic Categories

Table B1
Diagnostic Categories

Psychiatric Diagnosis	DSM Codes
Personality disorder	301.0, 301.20, 301.20, 301.22, 301.6, 301.7, 301.82, 301.83, 301.9
Schizophrenia	295.10, 295.30, 295.60, 295.70, 295.90, 296.01
Major depressive episode	296.20, 296.22, 296.23, 296.25, 296.30, 296.31, 296.32, 296.33, 296.34, 296.35, 296.36
Bipolar	296.04, 296.40, 296.43, 296.44, 296.45, 296.52, 296.50, 296.53, 296.54, 296.55, 296.60, 296.62, 296.63, 296.64, 296.7, 296.80, 296.89
Post traumatic shock disorder	309.81
Psychotic disorder	298.9
Dysthymic disorder	300.4
Alcohol or Drug Diagnosis	
Alcohol dependence	303.90
Opioid dependence	304.00
Sedative dependence	304.10
Cocaine dependence	304.20
Cannabis dependence	304.30
Amphetamine dependence	304.40
Hallucinogen dependence	304.50
Inhalant dependence	304.60
Polysubstance dependence	304.80
Other or unknown substance dependence	304.90
Nicotine dependence	305.10
Alcohol abuse	305.00
Sedative abuse	305.40
Cannabis abuse	305.20
Hallucinogen abuse	305.30
Opioid abuse	305.50
Cocaine abuse	305.60
Amphetamine abuse	305.70
Other or unknown substance abuse	305.90